

LEENA AKATAMA (ED.)

Experiences of Dry Sanitation in Southern Africa



Turku University of Applied Sciences

Reports

78

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SUMMARY

The year 2008 has been declared the Year of Sanitation by the United Nations. Sanitation is a pressing development issue as approximately 2.6 billion people do not have access to improved sanitation. Through adverse health effects and environmental degradation poor sanitation has severe effects on the society causing poverty in the third world.

Turku University of Applied Sciences and Global Dry Toilet Association of Finland are promoting dry sanitation in Swaziland and Zambia in Southern Africa. The projects provide sanitation and hygiene education, and build dry toilets for communities. The projects are funded by the Ministry for Foreign Affairs of Finland.

This publication is a collection of articles yielded by the two projects, written by project organisation members, student trainees and researchers. The articles share experiences of the sanitation situations in the respective countries, the reception that dry toilets have received and the involvement of the communities in the development, the management of sanitation projects and the sanitation sector, and the benefits of dry sanitation to the development of the communities.

CONTENTS

INTRODUCTION	7
FINNISH SANITATION PROJECT RELIEVES POOR SANITATION CONDITIONS IN ZAMBIA <i>Sari Huuhtanen and Ville Juusela</i>	9
THE STATE OF THE ZAMBIAN SANITATION SECTOR <i>Mia O'Neill</i>	21
NEED FOR CAPACITY BUILDING AND COMMUNITY OWNERSHIP IN MSUNDUZA TOWNSHIP, SWAZILAND <i>Leena Akatama</i>	30
INNOVATION DIFFUSION OF DRY TOILETS IN THE SOCIAL SYSTEM OF THE KALOKO AREA, ZAMBIA <i>Toni Paju</i>	37
CHALLENGES IN DRY SANITATION – CASES FROM SWAZILAND AND ZAMBIA <i>Sini Haimi, Linda Ranta and Jari Hietaranta</i>	46
SANITATION AND COMMUNITY PARTICIPATION: LESSONS FROM LUANSOBE-LUANKUNI, ZAMBIA <i>Emmanuel Mutamba</i>	55
ASSESSMENT OF SOCIAL CAPITAL THEORY IN GOBHOLO COMMUNITY, SWAZILAND <i>Ulla Ruuskanen</i>	63
EVALUATION OF URINE AS FERTILIZER IN MAIZE AND CABBAGE PRODUCTION IN KALOKO VILLAGE, ZAMBIA <i>Sari Huuhtanen and Antti Hannila</i>	72

INTRODUCTION

Sanitation is a necessity for good life. When functioning well and meeting the needs of the people, it is something that we do not give that much of a thought. The reality, however, in the world today is that only half of the population has access to adequate sanitation. Lack of safe toilet facilities bring infectious diseases, child mortality, low productivity, inequality and insecurity in many levels, degradation of environment, and poverty touching all corners of the society.

Dry sanitation is a concept which is making its coming to the field of development cooperation. Improved sanitation which functions without water, a scarce natural resource in many parts of the world, offers a sustainable solution for improving the sanitation of the poor. In addition dry toilets produce safe and inexpensive fertilizer turning waste into a resource.

Turku University of Applied Sciences (TUAS) has been promoting dry sanitation in Swaziland since 2007 in cooperation with Global Dry Toilet Association of Finland (GDTF). TUAS has vast experience about environmental health projects in Swaziland and has worked with Msunduzi community since 2004. GDTF is a Finnish non-governmental organisation working for protection of water resources and function of natural nutrient cycle through dry toilets promotion, development, and information dissemination. GDTF has currently two projects of its own running in Zambia.

The aim of this publication is to collect and share experiences gained in the dry sanitation projects in Swaziland and Zambia. The projects have been pioneers of their kind in the respective areas, which has brought both challenges and results. Experience sharing is a key to successful sanitation projects that better take into account the needs of the poor. The publication brings out the experiences through different points of views presented by articles about dry sanitation.

INTRODUCTION OF WRITERS

Sari Huuhtanen, Project Coordinator of GDTF, explains the backgrounds of sanitation and development and gives an introduction to GDTF projects in Zambia.

Mia O'Neill, a student of Department of Regional Studies in the University of Tampere talks about the sanitation sector in Zambia and the state's involvement in it.

Leena Akatama, Project Coordinator of Msunduzi Dry Sanitation Project at TUAS, analyzes the state of sanitation in Msunduzi Township in Swaziland and dry sanitation from the perspective of project management and local ownership.

Toni Paju, a trainee of the GDTE, introduces innovation diffusion theory in relation to dry toilets in Kaloko social system in Zambia.

Emmanuel Mutamba, a Zambian development practitioner and consultant, guides us to the importance of community participation in sanitation projects and shares lessons learnt in Luansombe-Luankuni communities in Zambia.

Sini Haimi and Linda Ranta, students of Department of Sustainable Development (DSD) in TUAS, and Jari Hietaranta, Project Manager and Primary Lecturer of DSD, assess both projects in Swaziland and Zambia in the light of the experiences, knowledge, prejudices, benefits, and threats of the project beneficiaries.

Ulla Ruuskanen, a student of Department of Social Services in TUAS, presents an assessment of social capital theory in one of the beneficiary communities of Msunduzi Dry Sanitation Project.

Sari Huuhtanen and Antti Hannila, a trainee of GDTE, evaluate the effectiveness of urine as fertilizer to cabbage and maize production in Zambia.

The publication offers interestingly various experiences about the topic of dry sanitation. Towards the end of the Year of Sanitation the whole team of writers hopes that the reader finds the experiences useful. Despite the theme year and projects coming to an end, sanitation still remains a current and vital topic.

Turku 14th November 2008

Leena Akatama

FINNISH SANITATION PROJECT RELIEVES POOR SANITATION CONDITIONS IN ZAMBIA

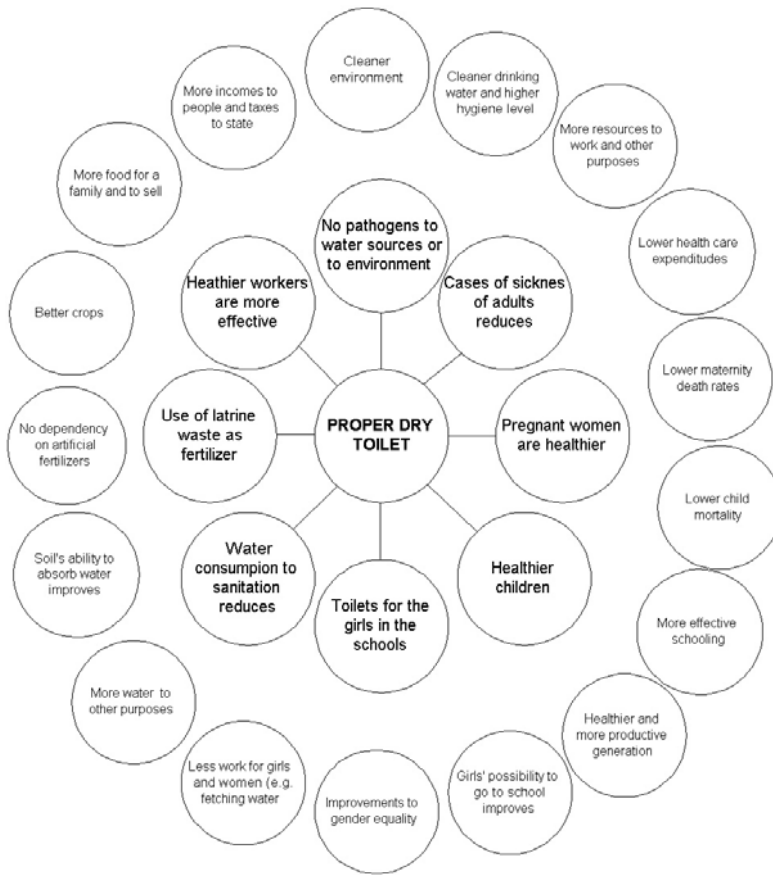
Sari Huuhtanen and Ville Juusela
Global Dry Toilet Association of Finland

POOR SANITATION AFFECTS PEOPLE'S LIVES IN MANY WAYS

There are approximately 2.6 billion people without proper sanitation throughout the world. These people live mainly in Africa, Asia and South America. For these people open defecation, “going to the bushes” is the only way to handle their sanitation. This leads to many problems. Health risks, hygiene problems, environmental pollution and increase of (mainly women’s) insecurity are examples of the consequences of insufficient sanitation. Often insufficient sanitation is connected to a defective water supply and waste water management and to general poverty. By improving sanitation, welfare can be directly and indirectly increased as a whole. Sanitation and water are connected to public health, the environment and rural development. Effects of good sanitation can be seen in picture 1 (Huuhtanen 2006).

SANITATION IN ZAMBIA

On the overall sanitation in Zambia is insufficient. About half of the population have access to improved sanitation facilities (United Nations Statistic division 2008 [15.9.2008]). This means that half of the people have to use mainly pit latrines or open pits, while some part of the population still goes to the “bushes”. The situation in rural areas is worse than in the cities but on the other hand it seems that the situation in rural areas has improved faster than in the cities (see figure 1). In the near future, the situation in the cities is not likely to improve because urbanization is increasing, and the Zambian government has not been capable of responding to the increasing need of water and sanitation services.



PICTURE I. *Effects of good sanitation. Picture: Huuhtanen 2006*

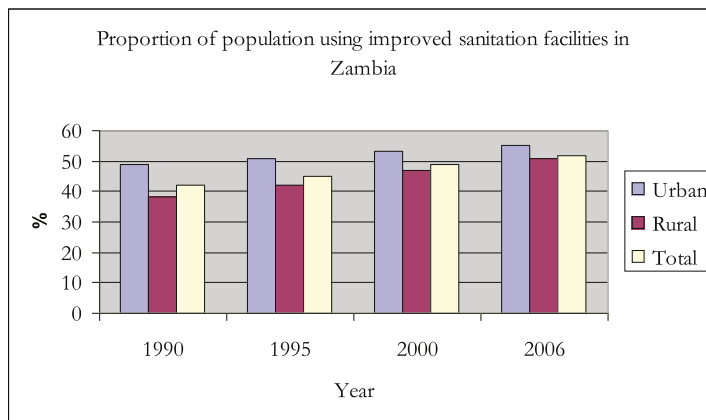


FIGURE I. *Proportion of population using improved sanitation facilities in Zambia (United Nations Statistic division 2008, modified by Huuhtanen 2008).*

PROJECT AREA

Kaloko is situated in the central part of Zambia, in the Copperbelt Province, Masaiti District about 70 km south of Ndola. It has a surface area of about 260 km² and its 12 village-areas are populated by about 10 000 people. The region has three big schools, a clinic, an education centre and several small community schools.

Most of the people in the area are small-scale farmers who sell their produce in the market area along the roadside and in the Kaloko centre. Sanitation in the area is based on pit latrines, mainly with temporary structure (picture 3). In two village areas there are VIP latrines (ventilated improved pit latrines). In the whole project area there is only one water closet with a septic tank.

Dry sanitation improvement programme for Zambia (ZASP) started in May 2006. The main funder during the three year program is the Ministry for Foreign Affairs of Finland. The project is implemented in co-operation with two project partners, Global Dry Toilet Association of Finland (GDTF) and Kaloko Trust Zambia (KTZ).



PICTURE 2. *Pit latrine with temporary grass structure. Picture: Sari Huuhtanen*

The connection between these two non-governmental organisations (NGOs) was formed in 1999 when the current Project Coordinator Sari Huuhtanen was doing her practical training in Zambia. Because water and sanitation issues had not changed radically since 1999, her study “Water Survey in Luansobe-Luankuni Environmental Programme area in Zambia” was used as a baseline data in the project planning.

PROJECT OBJECTIVES

The main target of the project is to increase the people’s interest in and consciousness of the importance of sanitation and hygiene. During the project, pilot dry toilets have been built mainly at schools and other public places, such as village health outposts. In addition to the construction, health education, and meetings and discussions have been major tools in making people aware of the importance of sanitation.

The objective is that the whole project area and its inhabitants would be inspired by the project and the functional sanitation would be eventually obtained in all villages around the project area. The goal is also to inspire people to use the toilet waste as a fertilizer, which would improve cultivation conditions within the area. It would also help farmers who do not have enough money to buy synthetic fertilizers.

The goal is to produce long-term improvements in people’s sanitation and to increase their awareness about sanitation and hygiene issues. The long-term development targets are (Global Dry Toilet Association of Finland 2005):

- to reduce illnesses and save human lives; promotion of better health through personal and environmental hygiene, which can be achieved by controlled management of toilet waste, and education.
- to increase equality; women’s and children’s needs and rights are taken into account when designing sanitation. Equality also means that no minority group of people is solely submitted to the handling of human waste.
- good management of the whole chain from the dry toilet to the re-inducement of nutrients into the fields. Nutrients are recycled to improve food security and soil conditions.
- to support the local businesses (e.g. cash crops, manufacturing toilet parts)

- improvement of the state of the environment, and saving and protecting water resources
- comprehensive improvement on the quality of life
- achieving the millennium development goals (MDG) of the UN

PROJECT IMPLEMENTATION

In the first phase of the project (year 2006) background information was collected from the project area and from previous studies and projects. To make the project succeed it was important to collect as much information as possible about the technical, economical, institutional, social and environmental factors from the project area.

The main assignment was to carry out the interview study within the project area as well as research the water sources and current sanitation practises. The interview study was utilised as the source of information when planning the sanitation and education and the building of toilets in the area. The following information was collected from the project area:

- present state of the sanitation (toilet types, numbers, users etc.)
- hygiene practises and the illnesses which have appeared in the area
- water supply and sanitation methods
- effect of the local culture on toilets (e.g. differences between male and female behaviour, hygiene, the local traditions and beliefs etc.)
- the use of composting toilets in the area (nutrient circulation & closed chain, need for nutrients, improvement of cultivation, manufacturing and selling toilet parts)
- sanitation and hygiene education level (what kind of education has been implemented, what would be needed, training of the contact persons and project assistants, training of the villagers etc.)
- partners in cooperation (previous and present projects, co-operation willingness, need for different projects in the area etc.)

The interview study was carried out by Finnish environmental engineering students and a project assistant (PA) of the local partner. The general information was gathered from literature, from previous studies and projects. Total coliforms and E.coli were analyzed from the typical water sources in 11 village areas (Pulkkinen 2007).

Before the beginning of the next phase of the project, sanitation expert education was organised for representatives of village areas and reference group people in order to familiarise them with sanitation, hygiene and dry toilets. The main goal was to have a sanitation expert in each village area so that they could spread the information to their neighbouring villages.

During the second stage of the project (year 2007–2008), the pilot toilets were established in chosen places (e.g. schools, health outposts). These places were decided during the first stage in co-operation with the local partner and the inhabitants of the area. In addition to building the pilot toilets, the implementation stage included sanitation and hygiene education in the area and guidance on the maintenance and use of toilets and the processed toilet waste.

PROJECT FINDINGS AND RESULTS

Baseline study (2006)

In the first phase of the project, an interview study was carried out. A few interesting findings were made in the study.

1) The importance of toilets as a hygiene and health issue was not well known. When it was asked which spreading routes of diseases people knew, only three people of 150 mentioned toilets. Flies and diseases like diarrhoea and cholera were mentioned more often (see diagram 1). (Huuhtanen 2006, 7.)

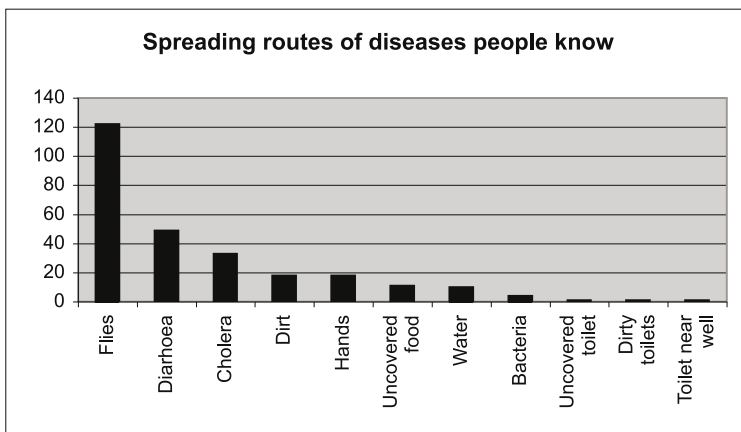


FIGURE 2. *Spreading routes of diseases that people know in the Kaloko area.*
Figure: Sari Huuhtanen

2) Only 12 percent of the interviewed mentioned hands as a spreading route of diseases and only 11 % of the respondents said that they can wash their hands near their toilet. Usually these people have a basin near the toilet. Most of the people come home to wash their hands (82 %). The importance of washing hands cannot be overestimated. Over one third of the cases of diarrhoeal diseases could be reduced simply by washing hands.

3) When people were asked which toilet types they know, almost everybody knew the flushing toilet. One fourth also knew about the VIP latrines. Nobody mentioned composting toilet or dry toilet. There was no composting culture at all in the project area, so we had to start from the very beginning when introducing the whole concept to the people.

4) People would rather see new toilets in market areas, schools and clinics. They mentioned that important characteristics of good toilets are toilet paper, water, soap, towel and cleanliness.

5) About one half of the population was ready to use toilet waste as a fertilizer and the other half was not. Many people have added comments to this question, such as “we don’t know how to do it; we can do it if we are trained to do it safely” etc. Thus people seem to really need more information and training. Some of the people said that they have never heard or seen this to be done.

CONSTRUCTION AND EDUCATIONAL PHASE (2007–2008)

The educational phase was started with a drama group, Kamoto Community Arts. They were doing a tour with 10 sensitizing performances attracting almost 2000 people in the audience. During these events, the educational days in each village area were agreed. In June–July 2007 there were almost 1000 people involved in the sanitation training. Unfortunately the Project Coordinator was not able to reach some of the distant villages due to transportation problems, and this is why in some villages people lost their interest in the project. The construction was to start with four devoted villages first. Our goal was to use local voluntary people in the construction work as much as possible. In these first villages, the involvement however was not as keen as they had first led us to understand, and there were just a few people on the construction site. But when the first dry toilets were finished, other villages wanted to get these toilets as well, and in the end they seemed to work harder than in the first villages.



PICTURE 4. *Kamoto Community Arts sensitizing people in Chisapa village in 2007.*
Picture: Sari Huuhtanen

The major problem in the beginning of the implementation phase was the lack of involvement by the village people. Involvement however improved dramatically after a leadership workshop and the formation of village sanitation clubs in January 2008. So far, nine clubs have been established. The aim of the sanitation clubs is to inspire more people to improve their village sanitation and the use of the toilet-generated fertilizer. All of the clubs are planning to have test fields in their communities to show people how urine and compost will work as fertilizers.

The construction work is still going on while this article is in the writing (September 2008). Eight toilets are ready and in use, and in three places the construction is still going on. It is worth noting, that the building of the toilets was done by selecting strategically good locations together with the local people, which means that the toilet will provide the biggest possible benefit at its selected location. Schools and village communities are examples of such places, since there are many people to use them, and hopefully this will also result in a posi-

tive impact on the surrounding environment as well, through reducing water pollution for instance.

The toilets built by GDTF act as examples only, since the philosophy of the project itself is to help the local communities to “pick up the concept” on their own, to create their own dry toilet culture later on in the future. Thus the builders should be local people, and they are provided with the technical solutions, instructions and guidance as well.

There have been some problems mainly with transportation which have delayed the schedules. The project staff has been trying to solve these problems by renting vehicles from time to time. In most cases the builders have to get to the villages on their bicycles; this is not an appropriate way to handle the transport, especially with tools and construction materials.

DRY SANITATION PROJECT MODEL

During the project a lot of information, material and experiences have been collected concerning dry sanitation. This material is not of use or benefit to anyone unless it is spread among people who are planning to start, or currently are, working with the same kind of projects. That is why one of the objectives of the project was to produce the Dry Sanitation Project Model. The model was completed in co-operation with a GDTF Project Coordinator and a student from Tampere University of Applied Sciences working as a trainee at GDTF; he also completed the project model as his Bachelor’s thesis.

The basic idea of the project model was to analyze the gathered data, and then try to extract the most significant features of it to be able to create the outline for establishing such a project. The main sections of the model are:

- baseline study; what information is needed to get the project started
- objectives and methods; what to do and how to achieve the goals
- lessons learnt; what was good and what went wrong, how to deal with the problems
- the technical section; how to construct the dry toilet

CONCLUSIONS

The project has managed to educate people about sanitation and hygiene issues. People are more aware of the connection of their hygiene behaviour and health. Also their attitudes towards dry toilets have become more positive. It has been recognised in a Bachelor's thesis study completed in the project area (Toni Paju 2008) that the attitudes towards dry toilets were significantly better among the people who participated in the project training. Training and meetings need to be carried on in the future as well. In this area “seeing is believing”; people do not believe in theory unless they see the progress in real life. If sanitation clubs work properly and more people see the advantages of dry toilets, attitudes are likely to improve in the future.



PICTURE 5. *Opening of the first dry toilet and its first user in Luansobe Basic School. Picture: Salla Vuorinen*

In the construction part there are still many challenges. Lack of reliable transport has been the main problem during the project. If the project receives continued funding, one option is to consider buying of a vehicle for the project, although in the current financial situation it seems impossible. People need to be inspired to get involved in the construction work so that as many people as possible would learn how to make dry toilets. Cheaper models need to be introduced to allow also families to benefit from the advantages of the dry toilets.

The project partners have applied for the continuation of the project for the years 2009–2011. Additional plans have been made: construction of boreholes with hand pumps would be a new component in the project. Education and construction of dry toilets will be continued. New cheaper models for dry toilets will be introduced for families. Also toilets for the disabled will be planned to meet special demands.

The need to improve sanitation is dire throughout the world. The dry sanitation model of GDTF gives some advice on which things should be taken into consideration when planning and implementing a dry sanitation project. It is hoped that the example and experiences of the GDTF would inspire a growing number of organisations and private persons to work towards better sanitation and a better world.

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THE STATE OF THE ZAMBIAN SANITATION SECTOR

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Many developing countries are struggling with managing their waste water and clean drinking water. This is often due to problems in the sanitation sector. As United Nations declared the year 2008 as the Year of Sanitation and the deadline of the Millennium Development Goals draws closer, the governments of the developing countries are forced to act quickly. They must get their national plans up to date and use the expertise and resources of donors as well as local and international NGOs.

In this paper, I will discuss the state of the sanitation sector in Zambia basing my arguments on the comments made by representatives of Zambian ministries, NGOs, donor countries and other relevant stakeholders. It turned out, that while sanitation does not acquire as much attention as the water sector in general, there are several stakeholders working on the problem of inadequate sanitation in Zambia. The government has targeted an increasing amount of the budget on sanitation and national policies are being drafted. Furthermore, the rather well organised NGOs working in the sector are contributing a great deal to the work done in the districts.

However, despite the good intentions, not everything is going according to plan. While there are several functioning plans, there are problems in the execution of projects. The ministries working on the policies have limited resources and occasionally the donors and organisations involved do not agree on the action steps. The government appears to lack the delegation skills and resources needed to make the process more efficient; it is still very much a question of power.

ZAMBIAN GOVERNANCE

Since its independence in 1964, Zambia has been a republic ruled by the president and the government. The government consists of 22 cabinet ministers,

who are in charge of their ministries respectively. (State House 2008.) The country itself is divided into nine provinces, which again have several districts within them. The districts are governed by city councils. The land is also divided into different areas which are governed by tribal chiefs. The government provides services such as education, health care, and water supply, but the chiefs are in charge of the land and the people in the traditional sense. (Republic of Zambia 2002, 8–9.)

The Zambian government has paid great attention to promoting good governance. Zambia is a functioning democracy and the elections of 2006 were successfully organised. One example of the work on good governance is promotion of decentralisation, which has been on going since 2002. When successful, decentralisation would give more responsibility to the local authorities, especially concerning implementation of projects.

Decentralisation

The National Decentralisation Policy was launched in 2004. The goal of decentralisation was to move responsibilities from the government to the local authorities. The vision of the government is "to achieve a fully decentralised and democratically elected system of governance characterised by open, predictable and transparent policy making and implementation processes, effective community participation in decision-making, development and administration of their local affairs while maintaining sufficient linkage between the centre and the periphery" (Republic of Zambia 2002, 18).

Decentralisation can take four different forms. *Deconcentration* is the transfer of functions and resources to lower level units of the same administrative system, while the decision-making authority remains in the centre. *Devolution* is the transfer of some powers and authority, functions and resources to lower levels, institutionalised by constitutional means. *Delegation* is the transfer of functions and resources to a subordinate authority with the capacity to act on the behalf of the superior authority without a formal transfer. *Privatisation* is the divestiture of state interests in public enterprises and the sale of such to the private sector. However, this cannot be applied in the case of public administration as public offices cannot be privatised. (Republic of Zambia 2002, iii–iv.)

The policy followed in Zambia is clear: "Decentralisation, if properly implemented can lead to efficient and effective delivery of services. Decentralisation

through devolution would be most effective as it ensures technical efficiency and effectiveness in service delivery and enhances popular participation.” (Republic of Zambia 2002, 6.) The benefits expected from the devolved system of decentralisation are as follows: political stability, lower level participation, enhanced accountability, improved responsiveness of government, tailor-made locally specified plans and increased motivation of field level personnel (Republic of Zambia 2002, 7). These aspects are all included in the definition of good governance and thus supported by international development aid.

Sanitation in governance

Zambia has a sanitation programme, which is usually put under the heading Water and Sanitation, where sanitation is discussed only briefly. In 2008, The National Sanitation Working Group (NSWG) consisting of government representatives, donors as well as NGOs working in the sanitation sector has been working on a new national sanitation programme. This programme, the National Urban Water Supply and Sanitation Programme (NUWSSP), concentrates as the name suggests mainly on urban sanitation. The preparation of the National Rural Water Supply and Sanitation Programme (NRWSSP) is also ongoing. Both of these programmes ought to be launched by the beginning of 2009.

The improvement of sanitation has been extremely slow. Zambia itself recognises the mistakes it has made in planning (Republic of Zambia 2006, 184): there were several programmes in the country to improve sanitation but they were not properly coordinated, which led to the inefficient use of the resources in the sector. In addition insufficient funding from the state and the lack of coordination made it more difficult to both realise and evaluate the programmes; put simply, much is up to political will.

STAKEHOLDERS OF THE SANITATION SECTOR

The sanitation sector in Zambia is divided very broadly. The main body at the moment is the National Sanitation Working Group working on the national policy on sanitation. The group consists of several bodies, all of which are introduced in the following.

National authorities

The government is highly determined to improve sanitation in Zambia. Their Vision 2030 states that Zambia would become a middle income country by the year 2030. This goal, being somewhat ambitious, indicates that long term solutions are needed in every development sector including sanitation. It would be important to find some political will to work on sanitation. In PRSP some optimistic results of improvement of sanitation are presented (Republic of Zambia 2006, 168, 186), but so far the results are showing slowly, if at all.

The Ministry of Local Government and Housing is the one primarily in charge of the development of the new national sanitation policies and sanitation as a whole. The Ministry of Health has great interest in sanitation and attends meetings at times. The Ministry of Energy and Water Development controls the National Water and Sanitation Council (NWASCO), but has no other interest towards sanitation. Other ministries are not involved with sanitation development in any way; they are simply informed of the decisions and policy drafts. (MLGH 14th July 2008; Danish Embassy 26th June 2008.)

Much of the responsibility has been delegated to commercial utilities (CUs). Formerly operated by City Councils, today private water and sewage companies are responsible for drainage and solid waste management in the districts. However, most facilities result in inadequate sewage treatment with the increase in population and a lack of maintenance of equipment (NGO WASH Forum 2008, 11).

Donors

There are a lot of donor countries operating in Zambia, from Europeans to Americans. Here I will, however, concentrate on the donor countries who are the key players in sanitation. The donors have agreed among themselves to share the responsibilities of different sectors between them. There are one or two countries leading the work on every sector to make sure that operations are coordinated and organised. This is a part of the harmonisation process set in the Paris Declaration. The main donor countries involved in sanitation are Germany and Denmark, which share the lead of the water and sanitation sector. Other countries doing sanitation work include Ireland and the Netherlands. Also Japan and Sweden are supporting some projects but to a lesser extent. There is also either a Danish or German representative at the National Sanitation Working

Group working on the national policy. They cooperate so that whenever one is not available to participate in a meeting, the other will attend to make sure the donors are represented. (Danish Embassy 26th June 2008.)

Non-Governmental Organisations

Due to the lack of resources, a great deal of responsibility is put on the shoulders of NGOs. Both local and international NGOs operate in several sectors in Zambia. Many of them cooperate with each other or the donors, but the state of cooperation is far from perfect. While many NGOs are involved in one or two sanitation projects, the number of NGOs with active projects on sanitation is small. The most active ones are CARE Zambia, Water and Sanitation Association of Zambia (WASAZA) and WaterAid, all of which have several ongoing projects on sanitation, emphasising community participation and ecological sanitation.

The NGOs working on water and sanitation are meeting monthly at a NGO WASH Forum, created as a communication tool for NGOs working in Zambia. At the Forum the participants discuss the problems at hand, share views and ideas and find ways to cooperate. Founded in 2007, the Forum has reached many of the international as well as local NGOs. Also UNICEF played an important role in the foundation process and is the secretariat of the Forum for the time being.

CHALLENGES

As explained above, the sanitation sector in Zambia is diverse and includes national authorities and donors as well as representatives of civil society. This diversity can be an asset but all too easily it may become a challenge.

Power distribution

One big issue identified by the stakeholders is the problem of power distribution. While all the parties acknowledge the importance of public participation to sanitation projects, the government finds it difficult to let go of the responsibility. The decentralisation process was launched to allow the districts more power in decision making and implementation of projects. However, as the

government seems to be reluctant to let go the decentralisation process is not advancing.

This presents a problem in several ways. Firstly, the cooperation between different stakeholders remains difficult and the public participation is challenging to arrange. Furthermore, the ministries simply do not have the capacity to plan, develop *and* implement everything that is necessary. Once the ministries face their limits, the progress becomes even slower and long-term goals are often put aside in order to achieve at least the short term goals. In terms of sanitation, this means more pit latrines instead of permanent toilet facilities and functioning wastewater management systems.

One dilemma represented in the practical application of decentralisation can thus be distinguished as: “the horizontal distribution of power along different realms and functional subsystems and the vertical distribution of power along different levels of government” (Voss et al 2007, 198). In the decentralisation process both the horizontal as well as the vertical distribution of power are amiss. In order for the sanitation development to progress, the horizontal distribution of power must be high. The ministries must cooperate and they need to work together with other stakeholders to have a strong enough effect. However, with the power struggle, the dialogue between ministries and other stakeholders is minute and, according to the Ministry of Local Government and Housing (14th July 2008), there is no leadership in the sanitation sector. Since everyone is responsible for some small area of sanitation development, and as all the parties wish to maintain their power over their sector, the possibilities for making progress are slim.

Eventually, it all comes down to political will; if the government is willing to proceed with the decentralisation process and distribute power to the districts. This is where the vertical distribution of power comes in. Vertical distribution of power refers to interdependencies of steering activities at different levels of governance, such as policy making at the level of the national government, regional states and local municipalities (Voss et al 2007, 198–199). In the case of Zambia, the decentralisation leading to high vertical distribution of power is not moving. With more resources and power, the districts could improve their situation and make it possible for the communities to have proper sanitation facilities. The decentralisation process is being prepared gradually, but there are still no proper mechanisms to channel money to the districts. (Antila 4th August

2008.) The success of the decentralisation process has an impact not only on governance but also on the conditions of poor people living in rural areas.

Participation

Power and participation underlie another issue: development aid. NGOs and donors assisting the government with sanitation do not always share the same views with the government. Earlier this was a problem: the governments of developing countries often complied with the suggestions of the donor countries, no matter what they thought was best. Today, the government of Zambia has acquired ownership over the development projects and has learned how to utilise the donors as a resource. However, there are still disagreements on certain policies, which is one reason why the national policies on sanitation are taking so long to be completed. (Danish Embassy 26th June 2008.)

The NGOs present a different kind of problem. The government is often detached from the real situation on the ground level. For this, they need to consult the true experts in the field: the NGOs. However, even though the NGOs are participating in the National Sanitation Working Group, they often feel that they are not being heard. In fact, not long ago the Zambian government wished to draft an NGO Bill to control the actions and knowledge of civil society. This was prevented by protests from the donor side, but the attitude towards the NGOs remains the same.

As described above, the stakeholders of the Zambian sanitation sector are many. The NGOs and donors are trying to cooperate and work on the ground level while the ministries are quietly delegating their work to Commercial Utilities instead of concentrating on completion of the decentralisation process. Meanwhile, the communities are left alone with their problems. A solution to this is offered by UNICEF and some NGOs. Community-Led and Community Based Total Sanitation (CLTS and CBTS) projects involve the communities and make them responsible for the work and development of the community. The organisations merely act as facilitators providing training and possibly partly subsidised equipment, but the community is responsible for the work and funding of the project. (UNICEF 22nd July 2008). The sanitation work done by communities passes by the decentralisation process and tackles the problem at its source. Citizen participation is often the only choice when the needs of the communities are being overlooked by experts and policy makers. Empowering the people gives them the opportunity to examine their own interests and im-

prove their lives. (Fischer 2002, 30, 40.) The final goal is that the governing institutions would learn to empower the people and thus contribute to the social development in the country (Wiman 2008).

CONCLUSION

It is evident that Zambia as a developing country still has a long way to go before the state of sanitation reaches acceptable standards in all areas of the country. However, some progress has been made. The Millennium Development Goal Progress Report 2008 indicates that Zambia is very likely to achieve most of the goals by the year 2015 – one of these goals being the MDG 7: Water & Sanitation. (Republic of Zambia 2008.) UNICEF among many others believes that public participation is the key and that community based or even community led sanitation projects will make it possible for Zambia to achieve the MDG 7 (UNICEF 22nd July 2008).

The path to progress will not be easy. The changes in the national political structure caused by the decentralisation process and the traditional ways of ruling from the top down will cause difficulties. However, some progress has been made, especially within the communities, as the CLTS and CBTS projects reach an increasing number of areas. There is a great need for strong political will for change but also the will of the people matters. It is a long way to go but the signs are there: with some effort Zambia has a good chance to develop the sanitation sector to the level required by the MDGs as well as the Vision 2030.

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NEED FOR CAPACITY BUILDING AND COMMUNITY OWNERSHIP IN MSUNDUZA TOWNSHIP, SWAZILAND

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This paper looks at dry sanitation from the project management and local ownership perspective and reveals the realities, challenges and successes that have surfaced in the Msunduza Dry Sanitation Project in Swaziland.

Msunduza Township in the capital city Mbabane in Swaziland is a peri-urban, partly informal settlement of about 16,000 people. The Township is divided into six communities with their own local leadership committees. Although Msunduza does have some general characteristics, such as mountainous landscape, inadequate community services, temporal housing materials and poor road network, the area consists of various differences in income levels, basis of residency (house owner or tenant), modes of housing and available facilities as well as in the origin of residents. Msunduza used to be part of the tribal land system managed by chiefs; later on it was acknowledged as part of Mbabane City and taken under the land management of the City Council followed by the large number of residents migrating from other areas in Swaziland.

Areas like Msunduza Township are common and growing in the small Kingdom of Swaziland due to the insufficient rural livelihoods and migration to the urban areas. Swaziland is among the top countries battling with the HIV/AIDS epidemic with the prevalence of 38.8 % (USAID 2005). The epidemic has a severe effect on the country's economy, development, and social networks as working adults are dying leaving orphans behind with little prospects of making a living. The effects are also seen in Msunduza.

In Swaziland, 59 % of people in the urban and 38 % in the rural areas have access to improved sanitation (WHO/Unicef 2006). Msunduza has a variety of sanitation solutions in use. In the official area, almost 70 % of households are

connected to the sewage system and have a water closet. In the unofficial area, only 10 % have a water closet, of which only 8.6 % are connected to the sewage systems and the rest use a traditional pit latrine. (Koivisto 2005.) Some households, particularly in the densely populated Mntulwini Community, use either their neighbour's toilet, the bucket system or the so-called "flying toilet", in which faeces are disposed in nature in a plastic bag. The waste water from water closets is often lead to septic tanks, from where the waste water leaks to the streets and yards as the families fail to empty the tanks due to expensive fees. This has caused recorded cases of cholera and other diarrheal diseases. Swaziland has also suffered from draughts during the past years and water has become far too expensive. For this reason many households with water closets have started to use a pit latrine instead.

The pit latrines commonly in use have some disadvantages to the environment and health. Most of the plots in Msunduzi are rather small. After a pit latrine has been filled in ca. 2–5 years, there is need for building another one to another location, limiting the space for other uses. Pit latrines are therefore temporal structures emphasising the nature of unofficial settlement. In steep slopes the faecal waste of the pit latrines percolates down to yards, water sources, and the environment.

FOCUS ON BETTER ENVIRONMENTAL HEALTH

The Department of Sustainable Development at Turku University of Applied Sciences (TUAS) has been working in Swaziland since 2004. The activities have taken place in Msunduzi since the beginning, as environmental health education about waste management and recycling, and the effects of poor environmental management on health and well-being was started with the help of Mbabane Municipal Council and local volunteers in the form of Environmental Health Education Project (EHEP 2004–2007).

The Msunduzi Dry Sanitation Project was initiated with concern for poor sanitation in Msunduzi during the operational phase of the EHEP. The Project is implemented in partnership with Salvation Army of Swaziland and Global Dry Toilet Association of Finland with the funding of The Ministry for Foreign Affairs of Finland 2007–2008. Students of Sustainable Development get practical work training in the project, spending 3–4 months running the field work in Mbabane.

The Msunduzu Dry Sanitation Project aims to improve sanitation in the area through five objectives with respective activities.

1. Improved sanitation hygiene

The project has provided the community with sanitation and hygiene education and built dry toilets in both public places, *i.e.* meeting points, schools and sports grounds, and households. To date, seven toilets have been built. Hand washing facilities have been improved in the community as well.

2. Increased and more effective composting and home gardening

The project has supported home gardening initiatives, especially the Mncitsini Youth Club. The promotion of usage of composted toilet waste as fertilizer will get more emphasis as the composting progresses. The project has produced education material about dry toilets and home gardening.

3. Improved state of environment

The project has through education and toilet construction improved the state of environment on micro level. Significant change in the whole community can be seen in a few years time if the project is successful.

4. Improved status of women and girls

Enhancement of the sanitation situation improves the status of women and girls in the communities, impacts that will be best seen in the long run. The project has, however, increased opportunities for the women and girls to participate in community work.

5. Improved know-how of the applicant

The implementation of the dry sanitation project has greatly increased the level of experience and knowledge of the project organisation in running a project of this kind. Sharing experiences is vital in order to spread the benefits wider.

The first phase of the project was the selection of community volunteers, “Sanitation Experts” and educating them in dry sanitation and hygiene in May 2007. The Sanitation Experts have been, throughout the project, a gateway to the grassroots level. Their work consists of door-to-door education, project progress monitoring and practical tasks in the community concerning the project activities.

The early start of the educational phase was highly important as the message of a new toilet model and its application to improve health and the environmental



PICTURE 1. *By increasing hand-wash facilities in the community hygiene can be significantly improved. Picture: Saija Illman*

state created demand for the toilets. Everybody was keen to see what these toilets were all about.

The construction phase began late, towards the end of 2007. This was mostly due to difficulties in decision-making in Swaziland. The community was not able to decide what type of dry toilet they would want and in which location the first ones would be built.

CHALLENGES IN THE PROJECT IMPLEMENTATION

The common denominator of the challenges to the implementation of the project is lack of capacity. The Urban Capacity Building Network defines *capacity building* as “human resource development, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively.” (GDRC)

Insufficient levels of skills and knowledge of the local partners and communities has contributed to ineffective project management, conflicts and misleading expectations in the community, and problems in the quality of construction. On the other hand responding to the need of expertise proved to be difficult as the Project Coordinator at TUAS was based in Finland, and was not able to spend long periods of time working with the local project organisation.

Community participation in Msunduzi is low. The large area is inhabited by people with little feel for belonging or community, struggling to find means to make a living. Volunteerism-based community work for sanitation is not the top priority for the majority of them. If the project would have more tangible and direct benefits to the families, such as income generation, health care services or schools, it could attract community involvement more easily. The stigmatisation of faecal waste has also reduced the motivation of people, especially the elderly. However, the community leadership has appreciated the project bringing visible results, *i.e.* constructed toilets, rather than merely concentrating on environmental education.

Local coordination has been overwhelmed by the challenges of managing a project unique and unfamiliar to its environment and facilitating community involvement. The low status of community members and the struggle for power between the community leaders have led to many conflicts and reluctance to work together in the project for a common goal. Conflict management and co-operation skills are in serious need in Msunduzi, as the community in many ways is not ready to host such a project. Fragmented community with the nature of temporality and inactive leadership do not make a functional community without particular emphasis to build one.

Construction of toilets stumbled in the beginning due to lack of experience of building such structures and lack of technology, but with cooperation and hearing the views of the users, satisfactory results were gained. The current toilets are, however, expensive compared to the local income levels and therefore the project has tried to find ways to identify low cost construction materials and models. One of the aims was organising a Dry Toilet Designing Competition for the constructors of Msunduzi. The idea of the competition was to identify local constructors, with whom the project could work, enabling more project resources to stay in the community and revive the local entrepreneurship. Nonetheless the acquired skills and knowledge of applying the dry sanitation concept proved too exacting and the competition at this stage did not render what was



PICTURE 2. *South African dry toilet model Enviroloo at the Msunduzu Sports Grounds. Picture: Sini Haimi*

expected of it. The project has also purchased Enviroloo dry toilets from South Africa, dry toilets that are technically more advanced and only require building structure around them. The benefits of the model is its low maintenance requirements as the technology (ventilation and warmth from the sun) ensures composting and drying of faecal waste, which makes the model particularly suitable for public places and schools, but the downside is the high cost.

RESULTS

Despite the great challenges to the project, the successes of the project prevail. The project has been able to introduce in rather a sound way an alien and culturally contradictory concept into the community. This has only been possible through the volunteers, the Sanitation Experts, who have educated the community and represented the project at the grassroots level. The sanitation education has both enriched those receiving it and those providing it. Especially for the young volunteers, an opportunity to act as a community educator has been em-

powering. The experiences have been especially good in the cooperation with the youth of Msunduzi, who are keen on starting home gardening and composting to find spare-time activities as well as additional nutrition and income to their families. Building on the enthusiasm of the youth, the project is most likely to succeed.

In general the project organisation has gained vast experience of dry sanitation and its applications in Swaziland. If the Msunduzi Dry Sanitation Project is successful, it will be able to provide long-term development solutions to the sanitation sector in Swaziland. The project has applied for continued funding for 2009–2011. In the new project period, the emphasis will be on toilet construction and education, as earlier, but it will also include the elements of increasing distribution of responsibilities to partners in Swaziland, capacity building to enhance community participation and better cooperation skills, and the aspect of linking dry sanitation to livelihoods.

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INNOVATION DIFFUSION OF DRY TOILETS IN THE SOCIAL SYSTEM OF THE KALOKO AREA, ZAMBIA

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Global Dry Toilet Association of Finland

The theme of the study is diffusion of dry toilet innovation in the social system of the Kaloko area, Zambia. The study was implemented as a Bachelor's thesis for Tampere University of Applied Sciences and implemented in the Zambian Dry Sanitation Improvement Programme (ZASP), which is run by the Global Dry Toilet Association of Finland. The ZASP aims at promoting ecological sanitation through the use of dry toilets. The aim of the study was to find out if there is a relationship between the level of knowledge that people have of dry toilets, and the adoption of dry toilet use in the communities around the project area. The work was done to find out why there are many people around the project area reluctant to use dry toilets even though they would have significant advantages in comparison to the current sanitation system.

The study was implemented using the theory of diffusion of innovations. Based on the results, suggestions were made to guide the project forward. The results can help the Global Dry Toilet Association of Finland and also other organizations working with similar projects, to develop new strategies for their projects and thus achieve wider acceptance of the innovation. The results are applicable to projects in developing countries to achieve better results when introducing new innovations.

INITIAL HYPOTHESIS AND RESEARCH PROBLEMS

The initial hypothesis was that there is a positive statistical relationship between how much the people in the project area know about dry toilets and their acceptance of the concept. In other words, people who have factual knowledge about dry toilets tend to accept and use the dry toilets more readily than people who do not have much information of them. This hypothesis is based on the idea presented in the theory of innovation diffusion: that the whole process is

about reducing uncertainty. When a person has factual knowledge about an innovation he is more confident of the consequences of adopting the innovation. Knowledge also reduces beliefs, which affect the attitudes towards dry toilets. (Rogers 2003, 14.)

I wanted to look at the advantage of dry toilets as experienced by the potential adopters, rather than the objective advantage. The reason for choosing this point of view comes from the criticism of innovation diffusion study that suggests that the researchers often side with the research funders and accept that the innovation possesses absolute advantage value. (Rogers 2003, 105–117.)

The main problems in the research are: what is the difference in attitude towards dry toilets between the people who attended hygiene and sanitation training, and the people who did not, and which factors affect the acceptance of the dry toilet concept the most. Other important research problems are how the people found out about dry toilets, and whether that affected their opinion.

INNOVATION AND INNOVATION DIFFUSION

Innovation can be defined as any idea or product which is new in local context (Aubert 2004, 11). The innovation under study here is the dry toilet, and it represents ecological sanitation. This particular innovation represents a modified version of the current practice which is the pit latrine. It requires a new way of thinking for the locals, when it comes to sanitation issues, because the re-use of the dry toilet waste is one of the goals of the project. It is an innovation that crosses cultural boundaries, and is in conflict with some of the traditional beliefs.

Rogers (2003, 5) defines innovation diffusion as the process in which an innovation is communicated through certain channels over time among the members of a social system. Different models have been developed based on the nature of the process. In figure 4 the model of the innovation decision process is exemplified. Rogers defines the communication as a two-way process of convergence (2003, 6). The special character of the communication originates from the newness of the idea. Every new idea has its own level of uncertainty involved. Information reduces uncertainty, and therefore reduces the amount of alternatives considered for the innovation. It has been concluded that the rate of innovation diffusion follows an S-shaped curve. It begins slowly, and when enough people of the same social system have adopted the innovation, the rate of adoption increases. When the amount of potential adopters decreases because

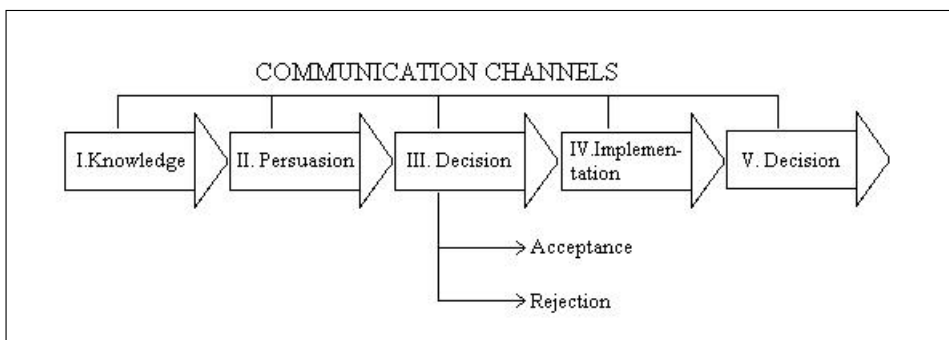


FIGURE I. *A modified model of the innovation decision process by Rogers (Paju 2008).*

most of them have already adopted the innovation, the rate begins to decrease (Rogers 2003, 11).

FACTORS AFFECTING THE INNOVATION DIFFUSION PROCESS

According to Rogers (2003, 11), the diffusion of innovation is affected by four main factors. These factors are the characteristics of the innovation itself, the communication channels through which the information of the innovation spreads, social system, and time. Different kind of innovations have different rate of adoption. According to Rogers (2003, 15-16), the innovation itself has five different characteristics which are of importance when looking at the effect on the rate of innovation diffusion. These characteristics are relative advantage, compatibility, complexity, trialability, and observability.

Another factor affecting the innovation diffusion process is the communication channels of the social system where the diffusion is being studied. Diffusion is a communication process, which concerns a new idea. The communication process includes the innovation, a person who has information or experience of the innovation, a person who does not have information or experience of the innovation, and a channel through which these two subjects exchange information about the innovation. The relationship between the two subjects defines the nature in which information about the innovation is passed on. Mass media is usually an effective way for passing on information, but interpersonal channels are most effective generally speaking. In this case we are dealing with a rural area of a developing country, and that is why the information exchange between individuals is the most important communication channel.

A social system is an abstract structure, which is constructed of the relationships between individuals belonging to the same social system. These individuals are joined together to accomplish a common goal. The structure defines the boundaries in which the innovation diffuses. A social system is formed of formal and informal relationships. The informal relationships define who communicates with whom, and in what circumstances. The high probability of communication between people who are similar to each other defines the communication structure of the system. If the situation were such that each individual would communicate with equal probability with each other member of the social system, there would be a lack of communication structure. (Rogers 2003, 23-24)

Time is present in the innovation diffusion process when an individual goes through the phases, which lead to adoption or rejection of the innovation. The phases are (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation.

People can be divided into different adopter categories depending on the time that an individual takes to move from knowledge phase to implementation phase. The categories are (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. These categories represent the innovativeness of the individual. As said before, the rate of innovation adoption has been seen to follow an S-shaped curve. The S-curve represents the percentage of the members to adopt the new innovation measured in a period of time. (Rogers 2003, 22-23)

METHODS

The study was implemented using a questionnaire with both quantitative and qualitative questions. The data was collected from 6 communities and the total number of interviewees was 51 (Table 1). The questionnaire was based on the theory of diffusion of innovations. The average age of the interviewees was 45.78, which is higher than the actual average in the area due to the fact that the interviews were conducted during day-time, when younger men and women were working on the fields. Out of the 51 interviewees, 48 were farmers by profession and the rest of them were teachers. The participation of men and women in the interview was 49 % and 51 % respectively. The key informants used in this research were the people from the project administration, and the headmen of the villages who are considered opinion leaders in the area.

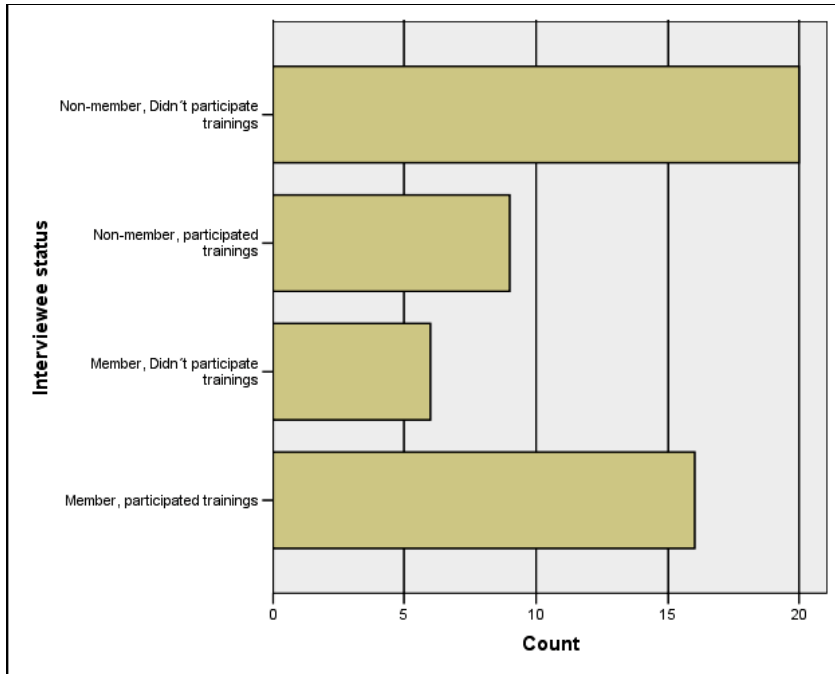


FIGURE 2. Interviewee status in the project. Non-member and member refer to membership in the sanitation club; training refers to the sanitation training.

The analysis method was deductive analysis, meaning that the results were observed against the framework set up in the theory chapter. The results were also compared to those of three other studies made in the field of innovation diffusion research.

TABLE I. The number and share of interviewees in different villages.

	Number of interviewees	Percent share (%)
Mwaitwa	5	9,8
Lumombwe	12	23,5
Kasamwa	8	15,7
Kweshwa	9	17,6
Kantolo	6	11,8
Chisapa	11	21,6
Total	51	100,0

The questionnaire was divided into three different parts, according to the theoretical background. The questions in the first part mapped how people felt about the innovation itself, the second part was about the communication channels in the area, and the third part was about the social system. Also questions about the perception on ZASP were asked.

THE RESULTS OF THE STUDY

The social system in this research consisted of all the villages where the project is being implemented. Main characteristics of the social system in the area are extremely homophilous social structure, low level of communication with the outside world and strong traditional norms. The two interests, when studying the effect of the social system of the project area on the diffusion process of dry toilets, were the norms and the opinion leaders of the social system. The norms were charted through the key informant interviews, and the opinion leaders were charted during the one-on-one interviews in the villages.

There were diverse sets of answers during the key informant interviews, when interviewees were asked about the cultural restrictions that the norms in the social system of the project area set on the use of dry toilets. All of the restrictions were connected to the use of human excreta as fertilizer, and especially to the use of faecal matter. Being in contact with human excreta was associated with mental illness. The communication structure in the area has two clear characteristics: most of the communication is restricted to the villages, and the communication that occurs between different villages is channelled through the Kaloko centre. There is no clear communication structure within the villages because of the extremely homophilous social structure. The relationships between people are mostly informal, and there is low level of hierarchy within the villages.

There are clear opinion leaders in the project area. The most respected opinion leader is the chief of the project area, who has expressed her support for the project. Other opinion leaders are the headmen of the villages, the headmaster and teachers of the schools, and the health care personnel. The GDTF and Kaloko Trust can be identified as the change agents. GDTF has hired a local project coordinator, who could be seen as the aide in reducing the gap between the change agent and the typical client. The clients are all the people in the project area. The innovation adoption or rejection decision in the case of dry toilets is an optional decision. However, the norms of the social system have a tremendous effect on the individual.

There were two advantages that people were expecting from the project, free fertilizer from the dry toilet waste and hygienic sanitation to reduce diarrheal diseases. Out of these two, 44 % of the people named the free fertilizer to be most important. Only 24 % of the people named improved hygiene as the most important thing. However, there was a bit of uncertainty among the people about the health effects of the fertilizer, which originated from the serious HIV epidemic in the area. There were also some beliefs against the use of human excreta as fertilizer. The need for being in contact, visual or physical, with the faeces was viewed negatively by some people. The adoption of the use of dry toilets in the area would require new ways of thinking among the people, and that can be a very slow process. However, one dimension of compatibility is the extent in which the innovation fulfils the needs of the user. And there is a clear need for the innovation since the prices of fertilizers are increasing, and most of the people in the area are farmers. It was shown that through education these beliefs and fears can be reduced and thus the attitude towards dry toilets can be made more positive. People trust the information they get about dry toilets in the hygiene and sanitation training, but at the same time they will not be convinced unless they see the results. So trialability and observability were extremely important for the people in order to use and utilize dry toilets.

There was no correlation between how the person had first found out about dry toilets, and how they perceived it. People perceived the information that they got from other villagers to be generally reliable and their opinion to matter when forming their own opinion of dry toilets. The two main information sources on dry toilets were the hygiene and sanitation training and other villagers. Most of the people said that the educational meetings had a great influence on their opinion of dry toilets. There were hundreds of people who took part in the educational meetings, but only some are involved in the construction of the dry toilets. One reason for this could be the fact that people in the area are not used to working without direct contribution. This is a point which came up also during the key informant interviews. The fact that almost all the people who attended the training had a positive attitude towards dry toilets suggests that the lack of involvement in the project originates from deep poverty and that people can not afford to spare time for work without direct contribution. However, there are enough people involved at the moment to take the project forward to the testing phase of the fertilizer. If the test results are positive, then most probably more people will join to contribute to the project, since there is direct economical benefit to be seen.

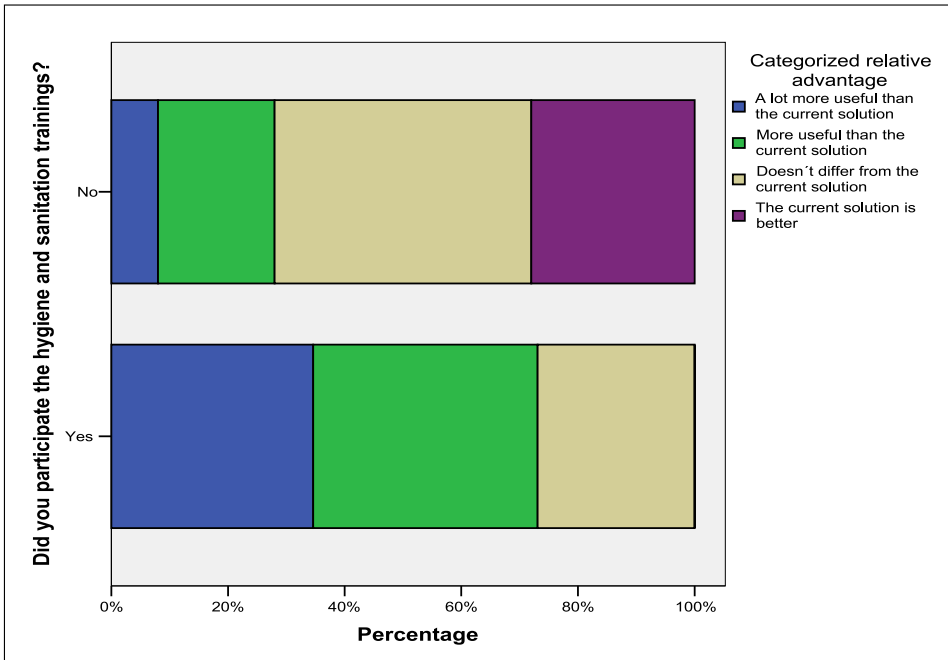


FIGURE 2. *The relationship between participating in the hygiene and sanitation training and attitude towards dry toilets. Figure: Toni Paju*

The norms of the social system were quite strongly against the use of dry toilet waste as fertilizer. However, it seemed that these beliefs were more strongly related to faecal matter than to urine. The use of urine compared to faecal matter as fertilizer has important practical differences. Urine has 80 % of all the nutrients in human excreta, and it can be used after preserving it for three months. Faecal matter has to be composted for a year before use, and it is considered a soil improving material rather than a fertilizer. The people in the project area did not seem to have adequate information on these issues, and if these things are made clear to the people, it might help bring down the cultural barriers regarding dry toilets. The point being that it is to offer a well grounded alternative to the beliefs which exist in the area, rather than to try and prove the beliefs to be wrong.

The involvement of the people in the dry toilet project by letting them decide the spot for the dry toilet and participate in the construction process appeared to be successful, since the people felt that the dry toilets were being built for the communities rather than for some external entities. I believe that this kind of

involvement in the future as well will help the people feel that they are building their own kind of dry toilet culture, rather than adopting Western habits to replace traditional habits. The homophilous social structure will probably increase the innovation adoption rate, once enough people have adopted the use of dry toilets and results of the fertilizing effect of urine have been shown. For this to happen there will also be a need for a low-cost model of a dry toilet in the future.

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CHALLENGES IN DRY SANITATION – CASES FROM SWAZILAND AND ZAMBIA

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The United Nations has declared the year 2008 the International Year of Sanitation and not without reason. According to different sources, 2.6-3 billion people live without proper sanitation and every day approximately 42 000 people die because of poor hygiene. Deficient sanitation also causes unnecessary costs. In developing countries almost two thirds of health care expenses are used on taking care of poor hygiene related diseases. In other words, by improving and developing sanitation solutions many lives as well as money can be saved.

The sanitation problems of developing countries can not be solved only by building sewerage systems and water closets. First of all, building and maintaining these is too expensive and secondly, lack of technology, resources and knowledge can cause even more severe health and environmental risks than using traditional pit latrines. In addition, it is absurd to pour vital and ever decreasing water resources down the toilet.

Because of these facts dry sanitation may seem like an appropriate solution for all the problems. In poor, underdeveloped and arid areas dry sanitation could be assumed to be a tempting alternative. Especially from the Finnish point of view it might be difficult to come up with disadvantages concerning dry toilets, due to our flourishing dry toilet culture, but globally the dry sanitation development may be confronted by many difficulties that arise from economical, cultural, ethical and environmental background.

However, even dry sanitation has its own challenges. If the waste is not managed in a proper way it can cause severe health risks when the bacteria spread out. Dry sanitation is also a new concept for most of the people especially in developing countries which must be taken into consideration when planning dry sanitation projects.

It is culturally insensitive to demand that others must adopt our dry toilet culture as we are used to it. In addition, there are a number of other challenges to be solved, such as prejudice, attitudes, taboos, local hierarchies and financial issues. Furthermore all these challenges may differ depending on whether you work in a rural or urban area.

BACKGROUND

This study examines two dry sanitation projects in Southern Africa. One is the Msunduzi Dry Sanitation Project (2007-2008) in Swaziland and the other is the Dry Sanitation Improvement Program for Zambia – ZASP (2006-2008). Main goals of both projects are (GDTF 2008a & b):

- to improve poor sanitation and hygiene
- to build dry toilets as well as inspire people to build dry toilets for their own families
- to educate people about hygiene issues
- to increase the use of toilet waste as fertilizer

The project areas differ from each other, especially by environment. The project area in Swaziland is located in Msunduzi which is a township of approximately 16 000 residents right next to the capital Mbabane. About half of it is unofficial residential area and part of it has no water or sewerage system. Msunduzi is very densely inhabited and partly situated on steep mountainsides. The population is also continuously increasing and Msunduzi is seen as a gateway to Mbabane. Most of the people who work outside the home are working in the second or third sector. The lack of sanitation and overpopulation together with steep topography and soil erosion causes waste to easily flow down to people's backyards causing various diseases, and it also pollutes surface and ground water. The problem is most severe during the rainy season.

Zambia's project area Kaloko is located in Copperbelt Province and it includes 11 villages. The population of the villages is about 10 000 people and almost 60 percent of people living in Kaloko have no toilet. The area is mostly flat and very sparsely inhabited. Distances within the project area are very long, which creates challenges for how to get to the building sites and transport all the necessary materials. Most of the village residents get their livelihood or part of it from agriculture.

RESEARCH METHODS

The study was carried out by students Sini Haimi and Linda Ranta from Turku University of Applied Sciences, Department of Sustainable Development. Interviews were used as the main research method during fieldtrips to project areas, Msunduza and Kaloko, in June 2008. Two weeks were spent in both countries and altogether 27 persons were interviewed. Interviewees were experts of nursing, teaching and the environmental field, volunteers in the projects and local people. The following issues were assessed: knowledge about dry sanitation, experiences, attitudes, prejudice, maintenance and resulting benefits and threats.

Although the framework of the interviews was designed beforehand, questions differed partly according to the interviewees. In addition, informal conversations, observation and experiences are used as data collection methods in this research. Both project areas were also studied in the field.

Interviews were made in English, siSwati and Bemba. siSwati and Bemba were used when interviewing local people where also an interpreter was needed. In both countries, the interpreter was a worker in the sanitation project.

RESULTS

The results were partly similar and partly differing between the countries. Motivating factors for taking part in the project, attitudes and knowledge about dry sanitation were pretty much the same. The differences were mainly related to the living environment. The results have been examined thematically.

Rural compared to urban area

Although the Msunduza area is urban, hilly and densely inhabited, the interviews revealed that the possibility of urban cultivation interested people due to increasing global food prices. When the local people were asked about the major benefits of dry sanitation, they answered that the resulting compost material which they can use as a fertilizer was the most important benefit. When experts of different fields were asked about the main benefit, they mentioned improvement in health conditions.



PICTURE 1. *Home gardens in Msunduzi bring low-cost food to the families. Picture: Linda Ranta*

In Kaloko, the ZASP project is located in a rural area and the formation of compost material was seen as the major benefit. Especially the possibility of using urine as a fertilizer was mentioned often, unlike in Msunduzi. This is probably because in Swaziland education was focused mainly on using solid compost material as fertilizer in gardening, and the possibility of also using urine was not mentioned in the training.

In both countries the current dry toilet models which are built of cement were thought to be too expensive by inhabitants. People cannot afford to buy the materials themselves. The problem in Swaziland was that any structures built from cheaper materials, like the traditional mud bricks, are not considered to be official buildings by the City Council. This leads to a vicious circle. People can not afford to build dry toilets using officially approved materials, but on the other hand they do not want to use unapproved materials, because structures built of those are not considered to be sustainable by the authorities. In Zambia this was not a problem. Although people can not afford cement, they were

willing to build dry toilets using other alternative and cheaper materials like straw, hay and timber.

Motivation for dry toilet usage

One of the goals of the study was to find out what motivates people to have and take care of a dry toilet. The results on the overall were similar in both studied areas. The best motivating factors were possible economic benefits in agriculture, the nutritious compost material and urine as well as vegetables grown in backyard gardens. Research shows, that money is the main motivator among both consumers in Msunduzi and farmers in Kaloko. The Msunduzi project also tries to motivate locals, especially women, to grow vegetables for retail sale.

Environmental issues were not seen as important in either one of the countries. In Msunduzi only experts of nursing, teaching and the environmental field mentioned environmental health and ecological aspects in interviews and assumed that reduced health risks would motivate people. The result is remarkable because Msunduzi hosted the Environmental Health Education Project during 2004–2007 which paid great attention to educating local pupils and inhabitants about environmental health issues. In spite of all the education, people still did not see improvements in environmental health as a benefit of dry sanitation.

In Kaloko, interviewees said the best way to motivate uncertain farmers is to show them the concrete benefits of dry sanitation. They also believed that more education is needed to get people to participate in projects and to work independently. Education about dry sanitation as an important motivator was also mentioned by all the interviewees in Msunduzi.

Attitudes and prejudices

Because dry sanitation is a new concept in both countries people had some prejudices about it. It was difficult for some to understand how human waste can turn into good and safe fertilizer. Nevertheless, with proper education and concrete benefits negative attitudes can be dispelled.

In urban areas like Msunduzi people often prefer modern water closets and dry toilets are considered inadequate progress. Some want to have a Western life-

style and therefore do not see dry sanitation as part of development process. On the other hand traditional ways of life remain strong and there are still people who do not consider using traditional pit latrines or the bushes as a problem.

Attitudes were different in Zambia. There the people saw dry toilets as development compared to the traditional pit latrines. At the same time there were some unreasonable beliefs. People thought they would become infected by using a toilet after someone diseased had used it. Because of sparse population, remote location and all the land area available the need for development of water closets is not seen as important.



PICTURE 2. *The first composting toilet in Msunduzu at a Community Meeting Point. Picture: Sini Haimi*

Culture and tradition

The values, attitudes, knowledge and patterns of individuals are affected by the culture in which they live. When people face problems and conflicts culture gives them answers. The success of these projects mainly depends on how well the concept of dry sanitation is adjusted to the culture. (Allahwerdi 1993.)

In both countries the idea of handling human faeces was a problem. That is why it is important to agree together who will take care of and clean the toilets, and empty the containers. Also talking about faeces was sometimes considered to be rude which challenged the education.

Both cultures are extremely leader-centered. Village elders and community leaders have authority and they are respected and heard when making decisions. In order to get local people to participate, it is vital to get the leaders' approval for the projects. Therefore it is extremely important to educate the decision-makers as well.

Though people look up to local leaders in Swaziland they are often suspicious of municipal officers and administration. They do not believe that officers look after the local people's best interests. Therefore, functional co-operation between actors from different sectors is important.

In the interviews it was revealed that although people would be unhappy with the leaders in the Kaloko region, they still do not dare to complain about it publicly or demand selection of a new leader. In this kind of situation, the project easily misses out on attention while other issues are more current and the leader is not respected. What also came up in the interviews was that in order to implement a sustainable project in Kaloko, it is crucial to execute plans and keep promises that foreign actors have made - otherwise people easily disassociate from projects.

CONCLUSIONS AND FUTURE RESEARCH

Changes in world economy and increased prices worried people in both countries. In Swaziland especially the rise in food prices often came up in conversations with people from all social classes. This will increase the interest towards urban cultivation. Due to expensive cost of living people in Msunduzi were enthusiastic about the possibility to grow their own food in backyard gardens.

In Kaloko people have long traditions in cultivating land. There the main concern was expensive fertilizers which people could not always afford to buy. Therefore, the opportunity to get free fertilizers from faeces and urine motivates people to learn about dry sanitation and to participate in the project. In other words, the threat of lack of food which originates from increased prices can be seen as the primary reason for interest in dry sanitation in both project areas.

Surprising about the results was that in Msunduza health issues did not come up more. Local people hardly mentioned environment or health at all during the interviews despite extensive education about the above-mentioned themes during the Environmental Health Education Project. Whether this was because the education has not reached people, they have not understood it or they do not see the connection between these two projects, did not come up in this research. This raises the challenge of re-arranging environmental health education in Msunduza.

Because people both in Msunduza and Kaloko are poor, and satisfying even the basic needs is sometimes difficult, it is understandable that concrete benefits like money and food motivate people the most. Also because life expectancy is low in both countries and death is close to people in everyday life it is no wonder they do not think much about the future or the state of the environment. That is why talking about long-term benefits or sustainable development does not motivate them.

In both countries people wanted more education. They believed it is the key in defeating prejudice and inspiring people to take part in projects. Education is also needed to decrease practical problems like using the toilet in the wrong way. It would also be important to include environmental health issues and dry sanitation in the curriculum for all levels at school.

Both projects have been going on for a short period of time which has to be taken into consideration when evaluating the results of this research. Change in sanitation behavior and culture is a long process. In Msunduza and Kaloko projects are still at building stage and only a few dry toilets are ready for use. Education should be continued in both countries. Later on it is important to assess the usage of dry toilets as well as attitudes towards them on a larger scale, in order to find out how well dry sanitation suits these cultures.

As seen in this study, there are many aspects to take into consideration when implementing sustainable dry sanitation projects in Southern Africa. The environment, culture and attitudes among many other things challenge the projects and the people working within them. But in spite of all the difficulties dry sanitation can be a solution to environmental, health and economical issues if it is successfully transformed to suit a new culture.

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SANITATION AND COMMUNITY PARTICIPATION: LESSONS FROM LUANSOBE-LUANKUNI, ZAMBIA

Emmanuel Mutamba

UNVEILING THE CONCEPT

Participatory development has taken centre stage in the developing world today. Community participation, participatory research, popular participation and partnership are some of the common terms used in the jargon of development. They all stem from the word ‘participate.’ The common element in these terms is that they are ‘externally’ created, mainly by donors. It has become a tradition in the last 30 years for donors or indeed any development agencies to demand for institutionalisation of participation in development projects, and even more so for community development projects. It is difficult to find documents, publications and policy statements today where participation or any of its derivatives is not thrown about.

Advocates of participatory development argue that development initiatives which lack active involvement of local people have lamentably failed, essentially because they lack local leadership and they are externally driven, and hence subsequently fail to inspire local people to assume ownership. The desirable paradigm shift hence is to lock out the top-down approaches and embrace local people’s active involvement in the whole development cycle, from needs assessments through planning to implementation and monitoring and evaluation.

It has been acknowledged in many areas that popular participation changes policies and repressive institutions. In complex issues such as environment, participatory techniques have helped communities develop collective responsibilities towards management of their resources. Participatory approaches have also brought about some measure of success in decision-making processes and accountability of public institutions.

In some cases though, the overuse or misuse of the word has created contradictions. Some researchers who are only keen to collect information from commu-

nities for their own benefit have rendered the concept irrelevant to the expectant communities. Often the local communities expect that the information collected by researchers could result in improvement of their well-being through initiation of development interventions. When this does not happen, the people feel cheated and tend to lose confidence in 'participatory research' thereby bringing the concept of participation into disrepute. Professionals also, especially academics are culprits when it comes to application of 'participation.' They often fail to recognise local peoples' indigenous knowledge and experiences. They live in closed environments and out of touch with realities of the complex, diverse and dynamic local communities. They find it hard to 'drop' to the level of local people. Their attitudes and behaviours inevitably render their research and work in local communities mere academic exercises without any relevance to the everyday struggles of local people. The political leadership also suffers from the top-down syndrome. There is a tendency among politicians to consider themselves providers of local people's needs while relegating local people to mere recipients.



PICTURE 1. *Outsiders must drop to the level of local people and respect local knowledge and traditions. Picture: GDTF*

This behaviour robs development initiatives local ownership and sustainability. When such interventions fail the blame is often heaped on the local people.

It is important to acknowledge that participation is a process; therefore it evolves at its proper pace and rhythm, adapted to the people involved rather than to bureaucratically, politically or externally defined projects or goals. It may not, short term, have an immediately quantifiable or measurable impact. It is a dynamic process which requires flexibility; it is situational-specific. In other words there cannot be a standard recipe for achieving participatory development; what makes it 'work' varies tremendously across different economic, political and cultural contexts.

Genuine participation can be only guaranteed where people accept an idea. Where an idea is imposed on the people the chance of success is very low. Acceptance of a new concept is also dependent on various factors which may include relevance to people's social and economic needs, compliance with the local people's cherished traditions and cultural values among others.

Lessons from Luansobe-Luankuni

Inadequate sanitation is still a major problem in the developing world. Recent research indicates that unsafe water, sanitation and hygiene accounted for over 1.5 million deaths from diarrhoeal diseases in low and middle-income countries. (ZASP Assessment report, 2007.) Zambian communities, like those in many other developing countries are confronted with serious sanitation and social/environmental problems.

In the Luansobe-Luankuni project area, a rural settlement situated in northern Zambia, inadequate clean and safe drinking water and the lack of sanitation facilities are a major constraint on the people. A study undertaken in 1999 found that only 10% of the inhabitants in the area had a borehole as their main water source. Others took their water from shallow wells or rivers. There were also few toilets in the villages (ZASP Assessment report, 2007).

In 2006 a three-year (2006-2008) Zambia Sanitation Project (ZASP) was initiated in the Luansobe-Luankuni settlement. It covers an area of 26,000 ha and has 10,000 inhabitants. The aim of ZASP is to improve sanitation and community livelihoods for the local communities. ZASP is being implemented under the partnership between a local Non Governmental Organisation (NGO), the

Kaloko Trust Zambia (KTZ) and the Global Dry Toilets Association of Finland (GDTF). GDTF is a Finnish NGO supporting initiatives that contribute to global efforts towards improving sanitation so as to contribute to attainment of the Millennium development goal No.7: *To halve the population of people suffering from lack of water and sanitation*. GDTF endeavours to ensure sanitation programmes producing long-term improvements on the people's sanitation and their consciousness of it. According to the project plan ZASP attempts to address the problems of sanitation, enhance the well-being of the environment and improve productivity through the following strategies: research, education, awareness, construction of dry toilets and application of compost manure from dry toilets to enhance crop yield. The project plan identifies community participation as a central factor in its implementation.

An evaluation exercise undertaken in October, 2007 to assess community participation in the ZASP project revealed some limitations and challenges. All the ZASP areas visited exhibited weak community participation in the project.



PICTURE 2. *Model of standard dry toilets built in Kaloko. Picture: Emmanuel Mutamba*

It was evident that the majority of the community members either conceived wrong expectations from the project or did not understand or appreciate the project ideas, especially with regard to the concept of dry toilets.

The assessment identified the following reasons for the seeming lack of interest and poor participation in the project:

Stigmatisation: The project suffered from stigmatisation. Most of the local people felt that the idea of dry toilets was ill-conceived and out of step with cultural and traditional values. The aspect of collecting human excreta was said to be an alien practice which was at variance with their culture. This was despite people generally acknowledging that poor sanitation and the lack of proper toilets presented a serious health problem in their area. Traditional pit-latrines are often blamed for ground water contamination. Another angle of stigmatisation was related to the use of compost from the toilets for crop production. Local people felt such crops could be contaminated and cause illnesses. The report argued that there was lack of respect for local cultures; hence the project failed to move according to the local people's rhythm.



PICTURE 3. *Traditional pit latrine. Picture: Emmanuel Mutamba*

Ineffective approach: The assessment revealed ineffectiveness in the implementation approach of involving the whole community from inception. The assessment report argued that the project presented new and unfamiliar concepts for which people needed time and proven results in order to appreciate them and become active participants. Starting with a small group of interested people as pioneers, it was said, could have brought about better results. The report proposed that change agents should be identified from within the community ranks to assume project leadership. Such persons needed to be empowered with skills to popularise new ideas and to educate and inspire their peers.



PICTURE 4. *Running away from community work? Not everyone in the community was pleased with the 'alien' dry toilet concept. Picture: Emmanuel Mutamba*

Limited skilled human resource: The number of skilled builders and carpenters was found to be relatively small in all project areas leading to hiring a constructor. This reduced community participation as people felt that they had no role to play at the dry toilets construction sites. The model dry toilets that were

being constructed were also too expensive; hence people felt they could not afford them.

Negative perception about Kaloko Trust Zambia (KTZ): Some of the participating communities did not have trust in KTZ, a key partner in the project. This was based on previous experiences of unfulfilled promises. The lesson here is that facilitators of participatory development need to be sincere and open to the communities they work with. Trust is one of the cornerstones of participation.

Conservatism: People in many rural and peri-urban communities are generally conservative by their nature and are often sceptical about new ideas. It is hence critical that project facilitators exercise patience and flexibility to allow community members understand and appreciate new concepts.

Government policies: The report identified weak government policy on organic agriculture as another reason for the seeming lack of interest in compost manure among the people. The policy of government on agriculture is far too inclined to promoting the use of synthetic fertilisers at the expense of organic farming. Hence farmers look at organic agriculture not as a 'better option' but as a 'least option.'

INTERVENTION

The October, 2007 assessment identified the following action points for strengthening community participation;

- Awareness creation and education should be sustained through the use of all possible methods including meetings, drama, posters, testimonies etc.
- Education programmes should produce community action plans with implementation time-frames, specific tasks and responsibilities.
- Interested community members in project areas should form sanitation groups to be called *Community Dry Toilets clubs* to pioneer the project.
- The dry toilets clubs should establish organic gardens on which compost from Dry toilets could be experimented and promoted as a better option to synthetic fertilisers.
- The project should invest in community capacity building (*Leadership skills, Community mobilization skills, Conflict management, Project Impact Monitoring*). A knowledgeable, inspirational and strong leadership is a prerequisite for attaining a successful and sustainable community development programme.

- ZASP and KTZ should redefine roles, tasks, responsibilities and reporting procedures for key management staff (*Project Coordinator, KTZ Director, Field Coordinator and volunteers*) in order to increase efficiency and win community trust.
- There is need to develop and provide training to project members on a low-cost model Dry toilet so as to enable them to construct their own toilets.
- Create publicity on the project (*e.g T-shirts, posters, chitenge attire materials*).

A follow-up assessment exercise undertaken in August and September, 2008, which was aimed at ascertaining the extent to which the action points identified in the October, 2007 assessment had been addressed reviewed a remarkable improvement in people's perceptions about the project and levels of community participation.



FIGURE 5. Leaders of a newly formed Dry toilets club in Luansobe-Luankuni discuss their action plans with members of the evaluation team. Picture: Emmanuel Mutamba

ASSESSMENT OF SOCIAL CAPITAL THEORY IN GOBHOLO COMMUNITY, SWAZILAND

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BACKGROUND INFORMATION

The following article was written on the basis of an Area Analysis made by Mrs. Ulla Ruuskanen and Mr. Juuso Aaltonen, students of Social Services at Turku University of Applied Sciences, in the Msunduzwa Township in Mbabane, the capital city of Swaziland. The analysis took place between 17th March and 4th April 2008 and consisted of two different questionnaires submitted to the City Council officials and key persons, and to the people living in that specific area. The goal of the analysis was to explore how the social capital theory works in a community and what kind of environment and living conditions there are in Msunduzwa. The team also wanted to collect necessary background information for the analysis to interview local people, to identify some of their expectations and needs in the area and to explore important facts, opinions and impressions for further development projects in the area (Kivinen, O. 2008). The emphasis however is on social capital theories. The study was part of student exchange between Turku University of Applied Sciences and Swaziland in 2008.

INTRODUCTION

Based on social capital theories, area analysis methodology and the objectives of the Dry Sanitation Project, Ruuskanen and Aaltonen construed questions for more detailed information and assembled a questionnaire for the interviewees. 22 persons in 15 different homesteads in the Gobhlo area were interviewed. At the beginning, the Head of Environmental Health and Pollution Control Office, Mrs Ellen Matsenjewa was visited and the task presented. From the City Council Ruuskanen and Aaltonen received material about the Msunduzwa area and the Dry Sanitation Project. Background research was done by searching the Internet and exploring literary sources, and studying the map of Msunduzwa.

Member of Central Committee and the Sanitation Expert, Mr Daniel Bhembe and the Sanitation Expert and Clean Up Campaign Leader, Mrs Futhie Shabangu along with Eeva-Leena Niemi and Laura Norokytö, students of the Department of Sustainable Development at Turku University of Applied Sciences provided consultation for the project.

The selected area in Msunduzi is Gobholo, which is an informal area of Msunduzi. Gobholo has never been urbanized, but it is now considered a semi-urban area. The way of life is rural and there is not much of built infrastructure. Many people in the area earn their money by doing unofficial jobs like taking care of other people's children and gardening. Social services and health care are not available in the area, except for the home-based taking care of sick people in the community as a primary care. Tiny matchbox houses - homesteads - are homes for large extended families. Many of the homesteads are cramped tin-roofed mudhouses. The lifestyle in Gobholo seems to be informal and vibrant. Population in the Gobholo area is around 1000 people, which is 18 % of all the people in the Msunduzi area. The number of children is 336, adolescents 228 and adults 472: male 232 and female 240. Only just over 25% of the 205 households of the Gobholo area have both parents. About 50% of the households have one parent and there are also many households headed by grandparents. 10% of the households are headed by children whose parents are dead, mostly because of AIDS. Compared with the number of people living in the area, Gobholo has the highest number of orphans in Msunduzi. (Msunduzi Township Survey 2005.)

Employment among adults in the Gobholo area is 60%. The number of self-employed adults in the Gobholo area is 122, which is a little over 40% of all employed adults. The gap between the rich and the poor living in Msunduzi and Mbabane is vast, and most people in Gobholo are living in poverty. (Msunduzi Township Survey 2005.) The City Council has made a decision to develop Gobholo into a formal area of Msunduzi and Mbabane. This means that people must also start to pay rates to the City Council in order to finance the building of infrastructure. That may cause problems because of the low income level. The 12 councilors of Municipal council of Mbabane represent different areas of Mbabane and community meetings are led by the councilors. The citizens and other stakeholders participate in the operations of the Council directly or through their representatives. Anyone at the age of 18 or above has the right to vote, and also citizens of all ages have the right to come up with initiatives.

SOCIAL CAPITAL THEORY

“Social capital helps community members combine their skills and knowledge to work for the benefit of the community and to access resources from outside the community” (S.Kilpatrick, 2002.) Social capital is broadly understood as the norms and networks that enable collective action and is one of the main themes in this article. The measurement of social well-being and viability can be linked with the term ‘social capital’. Woolcock’s theory on the other hand incorporates the governance structures and their interaction with associated communities in the realization of the benefits of social capital. As Woolcock says: *“Social capital is the social relationships that give rise to the outcomes of trust, reciprocity, and social norms, that facilitate collective action.”*

The question based on social capital theory was how Msunduza Dry Sanitation Project, which was funded by The Ministry for Foreign Affairs of Finland in 2007-2008, has improved the knowledge of better well-being and the co-operation between people, groups, non-governmental organizations and the City Council in Gobholo. The overall objective of the project was to improve Msunduza as a residential area, and the specific objectives of the project were also linked with social capital. To get more detailed information about the Gobholo area, Ruuskanen and Aaltonen worked closely together with sanitation expert Futhie Shabangu and the Sustainable Development students Eeva-Leena Niemi and Laura Norokytö. They made interviews by walking from one homestead to another and also took some photos to describe the people’s and homesteads’ way of living. Interviews were made in English whenever it was possible, but an essential prerequisite of success was that Mrs Shabangu, who speaks siSwati, came along as a contact person. She also knows the area, the people and the concept of dry sanitation very well. People living in Gobholo evidently trust her so they were more willing to say what they really thought about issues. Additionally Mrs Shabangu gave counselling about dry sanitation, health and hygiene.

People living in homesteads were mostly related to each other. There were also a few homesteads where there was an owner family and some tenants living together. Still only two of the interviewed persons were living in a rented homestead. Two out of 15 homesteads were headed by elderly people living with their grandchildren. In the smallest homestead there was only one old and lonely man. The biggest homestead was a home of 32 people who were also all related to each other. Ruuskanen and Aaltonen made the interviews during daytime so all regularly working persons in the homesteads were not at home. Ten out of 22 homesteads included people who were working regularly, and there were

also quite many people who earned their living by working irregularly and unofficially.

RESULTS OF THE INTERVIEW

Community Groups in the Gobholo area mentioned by interviewees

People in Gobholo are quite unaware of group action in the area. In the beginning many of them could not mention any groups or action regularly taking place in Gobholo. After the survey team had given some examples, the best known common activities that the interviewees mentioned were clean-up campaigns, football and area massmeetings where people of Gobholo gather together in a central place and discuss civic affairs and relevant issues, like whether or not the City Council is doing everything that it should to improve their welfare, new projects and occurred problems. Also most of the people mentioned that they had been active in the King's annual ceremonies, but those do not take



PICTURE 1. *Grandmothers taking care of household chores and children is common in Gobholo. Picture: Ulla Ruuskanen*

place in the Gobholo area. Additionally 18 of the interviewed persons participated or knew people who participated in youth clubs, music groups, children's day care, gardening or spending time with friends in public places.

There are few non-governmental organizations (NGOs) in Msunduzi within the area of social services and health care. None of those are situated in the Gobholo area, but are nevertheless operating in that specific area. Organizations promoting children's welfare defend the rights of women and children in areas such as legislative issues which may affect the status of women and children. They offer families and children a variety of services, including pre-school, a clinic, a drop-in centre, and care for orphans and vulnerable children. Organisations are the Salvation Army, Save the Children Swaziland and SACRO. The list of other groups taking action in the Gobholo area includes Lutsango Lwabomake, Imball, Regiments, The Gobholo Sunrise Association, co-operation with different groups.

Social relationships and ways of spending leisure time

All the interviewed people had internal connections in the Gobholo community, mostly within their homestead and relatives. People living in 12 different homesteads had external connections with non-Gobholo community members. External connections consisted of relatives and friends living mostly in other Msunduzi areas. Three persons also had external connections through work. The existence of both internal and external connections had helped the interviewed people to act together in the spirit of social capital for example with gardening, Youth Group, Clean-Up campaigns and football. Those connections had also drawn on external resources to enhance a couple of persons' productivity in self-employment. The interviewed Gobholo citizens did not trust people from other homesteads to help them when needed or to co-operate in common aims, which was surprising. The ties of trust and mutual help were formed among parents, siblings and relatives.

Spending weekends or leisure time did not differ much from the normal everyday lives of those not working regularly. Most of the interviewed people were staying at home, doing laundry, gardening, cleaning etc. Going to church on Sundays was the biggest difference compared to the program on other days. Six elderly persons told the interviewers that they go to church with their families, but none of the interviewed persons under 20 mentioned church in their leisure time activities. The most important activity among youth was definitely football.

Though many of the interviewed persons did not take part in Youth Groups or Clean-Up campaigns, these activities were still well-known and highly appreciated. It was noteworthy that there was always a group of people, mostly young men, playing cards and dices at nearby shops, even though just only one of the interviewed persons mentioned that as a common leisure time hobby.

Political awareness

Most of the interviewed persons were politically active. Over half of the respondents were interested in politics and only three of the respondents could not see the benefit of getting involved in political issues. In addition almost every one of the respondents had voted. Two of the respondents were under age and could not vote although they were planning on doing so when it would be possible. The most common ways of taking part in politics, excluding voting, were community mass meetings, project planning and making appeals. There is a huge amount of interest for local affairs among the people of Gobhola. Most of the interviewees were still a bit ignorant of the decision making process even in the Msunduzi area. The work and role of the Central Committee was well-known by only half of the respondents. Still the Central Committee and its work was appreciated and respected in the community. Respondents felt that the Central Committee is doing its best when working for the development of Gobhola. Additionally the Central Committee provides the people living in Msunduzi with an opportunity to interact with each other and make common practical decisions.

Compared to the Central Committee, the role of the City Council was described as distant and more concerning the elite. Respondents felt that the City Council was not doing enough for them because nothing seemed to happen despite all the promises. Most of the interviewed people could say something about the tasks of the City Council but none of them knew exactly what the organization, their principles and their plans of action were. The operational areas of the City Council mentioned in the interviews were building infrastructure, collecting waste, toilets, permissions for building houses, making roads, clean drinking water and taking care of orphans and vulnerable children. Central Committee is the main instrument for the people in Gobhola to materialize the social capital, and to follow up on the decisions made in the City Council and on how those decisions are affecting their lives. On the other hand the effective operation of the City Council depends on the ability of Mbabane citizens to hold elected representatives accountable for the quality of the administration

they provide. It is assumed that the more the City Council is made aware of the wishes of the Gobholo community, the greater the likelihood for its policies to meet the needs of the community will be.

Problems in the Gobholo area

Unemployment and poverty, existing infrastructure and HIV/AIDS are the main problems concerning the Gobholo area. Though HIV/AIDS was clearly mentioned only in one of the interviews, it is obvious that it affects life in the background. One of the elder respondents revealed that it is usual to hide sick people from even their own neighbors. One young woman also said that in the Youth Club meetings they discuss HIV/AIDS, and measures to prevent it and other difficult subjects. Most complaints about roads in Msunduzu come from Gobholo (Msunduzu Township Survey 2005). Many of the respondents also mentioned waste and dirtiness, lack of schools and high school fees, lack of clean drinking water, lack of transportation and lack of streetlights, crime



PICTURE 2. *Young men playing cards by the roadside. Picture: Ulla Ruuskanen*

and untrustworthiness of people. Another issue that a number of respondents brought up was that they are losing their faith in bureaucrats. The main reason was that before elections many promises of improvement are made but afterwards they are routinely forgotten.

How to develop Gobholo: the opinion of the interviewed people

People of Gobholo would really like to improve their own area and its environment in many ways. They had plenty of ideas how to make Gobholo a more comfortable place to live. For children and the young the respondents suggested day care, pre-school and school, workshops to train for a job (for example carpentry), playgrounds and sports fields and various other facilities for doing something more meaningful (like dancing, playing music etc.) than hanging around in the streets. The interviewed people would like to get some kind of a working center for women where they could meet each other and do things they are good in, like handicrafts and weaving. On the infrastructure side, respondents would like to have a market place built up. They also desperately need streetlights especially in the lower part of Gobholo, local transportation and renovation of the roads.

During the interviews it became apparent that people had discussed these things at community meetings and that they already had plans for where to build places, for example a market area and a school, but the funding is still an unsolved problem. The people living in Gobholo would never be able to collect the amount of money needed without big donations or help from the City Council.

CONCLUSIONS

The networking with the Dry Sanitation Project, which Ruuskanen and Aaltonen and their team undertook to explore and update, surveying the environment and the sanitation conditions in Gobholo, gave good synergy. It is also recommended that social capital theories be adopted as the background of any multi-professional network in the future, because the theories incorporate also the governance structures and their interaction with associated communities in the realization of the benefits of social capital. Social capital is today a widely used concept in the list of key variables when trying to explain political and economic phenomena also. Area analysis as a method of multi-professional networking is well-suited for the theories and practices of sustainable development

and social work. In the future it will in all likelihood be necessary to develop the cooperation between these professions. The suggestion is that this cooperation is continued and maybe also expanded to embrace for example students of health care, since in Msunduzi there is still great need for health education and advice as well. Social work as a discipline consists of counselling, investigation and support of individuals and groups with social problems. Preventive social work and field work with people of different ages are today important methods of social sector.

In addition to the objectives of the Msunduzi Dry Sanitation Project, the aims of the network in the future could be to promote the Gobholo citizens' participation in community issues, to survey and disseminate methods and practices that enable participation and encourage community members' joint ventures within Youth Club activities and other leisure time social activities, the Msunduzi Dry Sanitation Project campaigns, and networks like the Central Committee, which enable collective action. Another goal could be developing the interaction between community members and various operators in the field of developing Gobholo. Methods used in multi-professional development work can be for example academic theses, group counselling and functional methods, guidance and advice for sustainable development, health care and social sector issues as well as field work. With small interventions it is easily possible to support the people of Gobholo in their efforts to attain common aims. Even in a short time period significant development can take place.

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EVALUATION OF URINE AS FERTILIZER IN MAIZE AND CABBAGE PRODUCTION IN KALOKO VILLAGE, ZAMBIA

Sari Huuhtanen and Antti Hannila

AIM OF THE STUDY

This article is based on a study completed as a Bachelor's thesis for Tampere University of Applied Sciences, as part of the ZASP project. The main task was to test the value of urine as fertilizer and also to demonstrate the results to the locals. The urine used in the study was collected from the dry toilets built within the ZASP project. The aim was to survey the effects of urine to the growing results in local conditions in Zambia. Also the aim was to convince the local people that urine is a safe and efficient fertilizer by showing how it is used in practice.

The local people's attitudes towards dry toilets and dealing with human excreta, before the project, were mostly negative or indifferent because of the stigmatic status of handling human waste. One of the main objectives was to change this trend. Showing previous studies on the subject to the people does not deliver the message the same way as performing an actual study amidst them will do, allowing the people to see the results with their own eyes. This also teaches people how to utilize the urine much better than giving lectures or literature on it. In the long run, it is desired that the local people would implement the lessons learned from this study and spread the knowledge onwards.

UTILIZATION OF THE LATRINE WASTE

The annual amount of excrement (urine and faecal matter) from a single person contains approximately the same amount of nutrients that are required to grow grain for single person's annual need. Basically, this means that we all produce enough fertilizer to cover our own food requirements. The figures can be seen in table 1. (Malkki 1995)

TABLE I. *The amounts of nutrients in human excrement (person/year) in the Western diet.*

The most important nutrients	Urine (500L)	Solid excrement (50 L)	Total	Nutrients required to produce 250kg of grain
Nitrogen (N)	5.6 kg	0.09kg	5.7kg	5.6kg
Phosphorus (P)	0.4 kg	0.19kg	0.6kg	0.7kg
Potassium (K)	1.0 kg	0.17kg	1.2kg	1.2kg
Total	7.0kg	0.45kg	7.5kg	7.5kg

As can be seen from the table above, most of the nutrients in human excrement are in urine, which makes it an excellent fertilizer. It would be most beneficial for the soil to use both urine and faeces, but not necessarily during the same year in the same area. (Huuhtanen & Laukkanen 2006)

In many ways, urine is an excellent fertilizer if stored and applied properly. The most important nutrient in fertilizing, nitrogen can mostly be found in the form of urea in urine. Phosphorus can be found in urine as superphosphate and potassium in an ionic form, easily available for the plants. Urine also contains micronutrients in a balanced way. Up to 60 - 70 percent of the plant nutrients produced for human consumption in agriculture end up in human excreta. Actually 70-90 percent of the nutrients in human excrement can be found urine, which contains hardly any microbes, whereas faecal matter contains the rest of the nutrients, but also a lot of bacteria and pathogens. This is the reason why urine should be separated from faecal matter at the point of collection. It should be noticed, though, that for example cystitis, typhoid fever, schistosomiasis or leptospirosis infected people can have pathogens in their urine. The following bacteria have been found in urine: *Leptospira interrogans*, *Salmonella typhi*, *Salmonella paratyphi* and *Schistosoma haematobium*. Even if bacteria are found in urine they usually die quite fast and do not pose a threat in further utilisation of urine. Nevertheless, the urine should be stored before application especially if it is known that diseased people have been using the latrine where the urine was collected from. More importantly, the urine should be stored because there is a substantial risk of cross contamination with faeces. There are different guidelines on the storing period before applying it on the crop, but in general the recommendations are from 3 to 6 months which is enough for the pH of urine to increase and cause the pathogens to die. (Jönsson, 2004; Huuhtanen & Laukkanen 2006)

METHODOLOGY

The study was carried out during a three-month period in February-May 2008 in Kaloko, Zambia. The beginning of the study was conducted during the wet season, the plants being rainfed, but towards the end of the growing season, the plants had to be watered frequently. The two species used in the experiment were flour maize (*Zea mays amyloacea*) and a riana-variety cabbage (*Brassica oleracea capitata*), both having the suggestive growing period of 90 days. These species were chosen because they are both widely used and play an important role in people's diet in the part of Africa where the study took place. The area used for the experiment was a fenced garden of Luansobe basic school.

TREATMENT PLOTS

There were three plots with one control plot used in the experiment. The treatments used were urine, cow dung and artificial fertilizer respectively. In control plot, no crop nutrients were added. Each test plot had the size of 30m² (3m x 10m) consisting of 3 separate beds (see figure 1). In one bed, two rows of maize were planted with intervals of 30 centimeters and in two of the beds the cabbages were planted with same intervals. The cabbages were planted as young seedlings, but the maize was planted as seeds. Some of the maize seeds were already rotten at the time of purchase, so the ones to be planted were handpicked. There were also other difficulties with the garden and seedlings later on in the study, affecting the development of the crops.

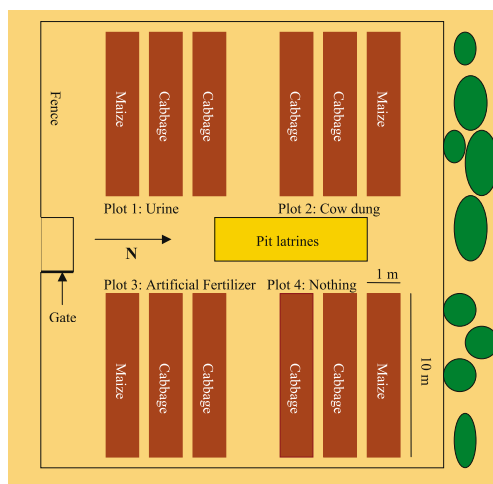


FIGURE I. Drawing of Luansobe school garden where the experiment took place.

The urine used in the experiment was collected initially from a single dry toilet built in ZASP project, but later on during the study another one was finished and it was used for collection as well. From the beginning there were difficulties getting enough urine for the experiment. It was estimated that the urine used in the experiment had 3 grams of nitrogen per liter. The estimation was based on the low amount of protein in the local people's diet.

The original plan was to use a reference value of 175 kilograms of nitrogen per hectare, but because of difficulties in getting enough urine, eventually 100 kg/ha was used. In relation to the size of the test plot, this meant 100 liters of urine or 300 grams of nitrogen. The urine was applied in five separate portions during the first two months of the growing season. It was supposed to be applied in five equal portions of 20 liters, but because not enough urine was always in store at the time of application, the size of the portion was not always the same. Nevertheless, the total amount of urine added to the plot in the end was 100 liters.

The urine was diluted with a ratio of 3:1 (three liters of water to one liter of urine). The diluted solution was applied evenly to the base of all plants in the bed with a watering can, after which it was covered with soil to minimize evaporation. (Viskari 2008.)

Other plots

On the second test plot, cow dung was used as a crop nutrient. Six wheelbarrows (180 kilograms) of cow dung were mixed with the soil in the three beds just before sowing.

On the third test plot an artificial fertilizer, Compound D (10% Nitrogen, 20% Phosphorus, 10% Potassium and 6% Sulphur) was used. It is widely used in Africa as a basal fertilizer. Compound D was applied in two portions during the growing season. In the first portion (one week after the sowing) 1.6 kilograms of compound D was applied, containing 160 grams of nitrogen. The second portion of 1.4 kilograms (140g N) was applied in the middle of the growing season. The total amount of 300 grams of nitrogen applied was therefore estimated to be equal to the plot with urine. The amount of 300 grams in the test plot is relative to 100kg/ha. The compound D granules were evenly applied to the base of the plants.

In the control plot (plot 4), maize and cabbage were planted and allowed to grow without any crop nutrients applied. Otherwise, the plot was weeded, watered and looked after as the other plots.

MEASURING THE FINAL RESULTS

In the final measurements, five randomly chosen cabbages and maize cobs were removed from each plot and weighed. From these results, the average was calculated. Because of multiple problems that occurred during the study, we did not get a lot of mature plants, resulting in low sample size ($n=5$). Furthermore, from plot 2 (cow dung) we managed to get only two maize cobs, giving even lower sample size in that specific plot. Of the maize cobs, also length and width were measured. A simple manual balance was used in the weight measurements, whereas the dimensions of maize cobs were measured with a tape measure.

The results were supposed to be measured 90 days after sowing, but because we managed to launch the study later than originally expected and I had to leave the project area, they had to be measured 12 days ahead of schedule.

Cutting approximately two weeks from the growing period meant that the size of cabbage and maize remained somewhat smaller than after a full growing season, making it hard to compare the results with previous similar studies. Nevertheless, as the main objective of the study was to see the use of urine as a fertilizer in practice and show it to the locals, the shorter growing season had minor effect on it.

Cabbage

Cabbage did quite well in all of the test plots, even though distinction could be seen between the different treatments. When the cabbage was harvested, it was noticeable that the growing season was still ongoing. Cabbages are supposed to form a round head and even though most of the cabbage had started forming a ball in the middle, most of the outer leaves were still open. There was a lot of variation in the size of cabbages not only between the different plots, but also within the plots. From the results, it can be seen that artificial fertilizer gave the best results with an average weight of 801.7 grams, but the results obtained with urine were good as well with an average weight of 673.2 grams. When taking the standard deviation into account, the results from urine can be considered

as good as from artificial fertilizer. A graphical presentation of the results can be seen in figure 2, giving a better idea of the differences between the different treatments.

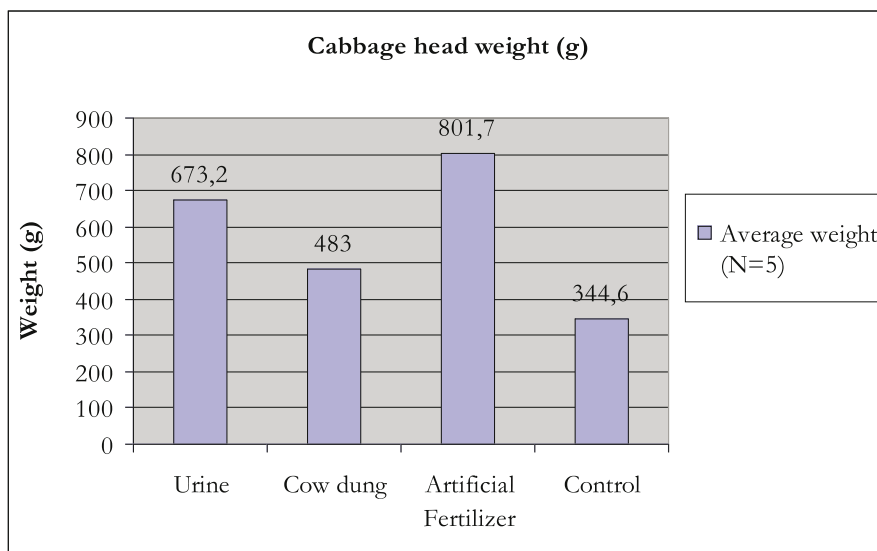


FIGURE 2. Graphical presentation of cabbage weight results with different fertilizers.

Maize

With maize, the yield remained relatively low in all the test plots and a proper comparison was harder to establish. There are various reasons that might have had an effect on the crops, leading to lower yield. As the soil was not studied before the experiment, it is hard to tell if the characteristics of the soil were unsuitable for maize production. Clear signs of nutrient deficiencies were found though, suggesting the soil was not fertile enough. Many of the leaves of the plants on all test plots had yellow stripes indicating magnesium deficiency.

Compound D and urine gave somewhat equal results, whereas the results from the other two treatments came far behind. The margin between different treatments was far more distinctive than with cabbage, but no matter which fertilizer was used, the size of the maize cobs remained surprisingly small, most likely because of too short a growing season. Different properties were studied and measured from the maize cobs, namely weight, length and width. It was hoped that

this would give a wider perspective to the comparison and possibly shed some light on why the yield remained so low with all the different controls. The results of the maize cob measurements can be found in the figures 3, 4 and 5.

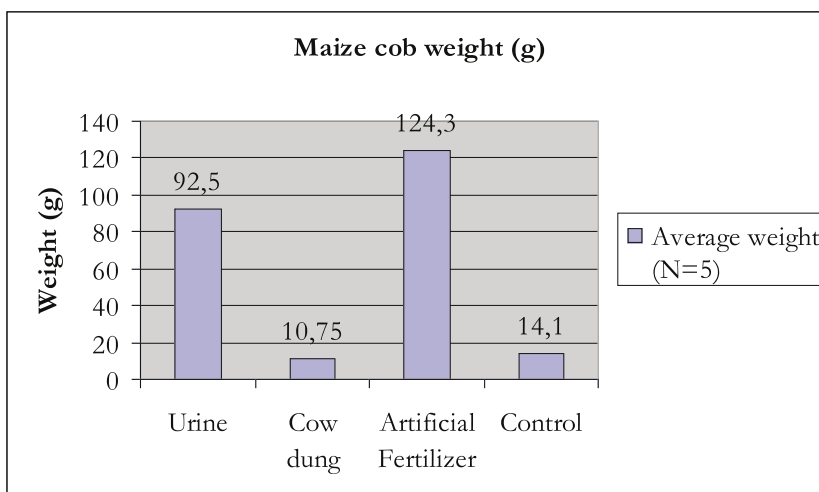


FIGURE 3. Graphical presentation of maize cob weight with different fertilizers.

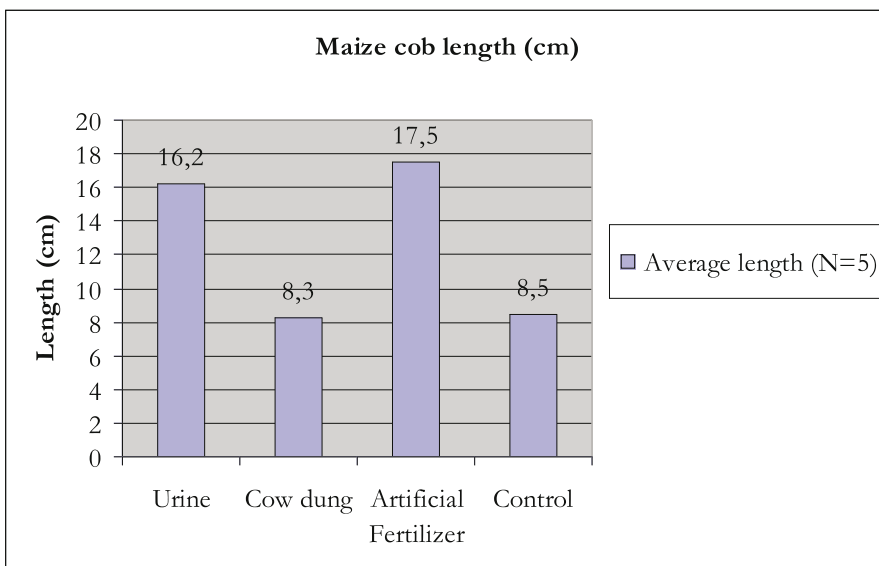


FIGURE 4. Graphical presentation of maize cob length results with different fertilizers.

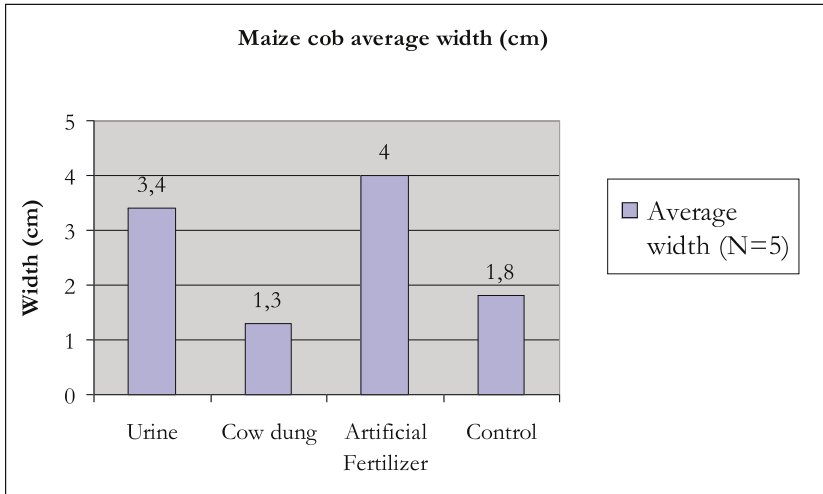


FIGURE 5. Graphical presentation of maize cob width results with different fertilizers.

CONCLUSIONS

This experiment had two goals, to test urine use as a fertilizer in local conditions and on the other hand show local people the results to encourage people to use urine in their own fields.

The results show that urine is comparable to artificial fertilizer in terms of mass growth of cabbage and maize. However, in general the yield of cabbage and maize was smaller than expected in each test plot. There were multiple setbacks and problems faced during the experiment (heavy rains, poor seedlings, animals destroying the garden, insufficient amount of available urine etc.) directly and indirectly affecting the results. As the soil was not studied before the experiment, it is hard to specify whether the reason of the poor yield was because of these setbacks or because there was lack of some important nutrients and if so, what those nutrients were, or whether the salinity of the soil was too high or characteristics of the soil in some other way were poor for cultivation.

Cabbage showed no external signs of any kind of nutrient deficiency, but remained smaller than the species normally are. There was a noticeable difference in the average size of cabbage from different plots, but also a lot of variation within the plots. The biggest cabbage weighed 1483 grams (plot 3: artificial fer-

tilizer) as the smallest one was only 168 grams (plot 2: cow dung). Not all of the cabbage seedlings planted survived or reached the mature phase, but the percentage was still rather good considering the setbacks faced.

The tests with maize were not as satisfactory as those with cabbage. Even though comparison to some extent was possible, it should only be considered suggestive. The maize suffered substantially from nutrient deficiencies, remaining small and not producing cobs as it should. The yellow streaks on most of the leaves were most likely the result of magnesium deficiency, but without further research, it is hard to be sure. According to the headmaster of Luansobe School, Mr. Han-yama Habanyama, the soil is also poor in boron (B) the deficiency of which affects the uptake of many elements by plants.

It is surprising that only two maize cobs could be collected from the plot fertilized with cow dung, and that also these seemed to remain smaller than the plants in any of the other plots. One explanation for this is the lack of sunshine, as the plot received the least amount of sun. The foliage of the trees north of the



FIGURE 6. *Luansobe School garden. In the front right maize without any fertilizer, in the left side of the picture maize fertilized with artificial fertilizer and on the background plot fertilized with urine.*

garden kept the plot mostly in the shade during midday. This, however, did not seem to have any effect on the cabbage.

The stems of the maize in the plot fertilized with compound D were clearly taller than in any of the others, reaching two meters in height, whereas in plots 2 (cow dung) and 4 (control plot) the stems barely reached the height of one meter. The ones fertilized with urine remained reasonably small in size, but produced large cobs in relation to the plant size. The dimensions of cobs collected from all the plots were rather small, but the ones collected from plots 2 (cow dung) and 4 (control plot) were ridiculously small, weighing less than 20 grams and not even reaching the length of 10 centimeters. Even the larger cobs collected from plots 1 (urine) and (compound D) seemed immature though.

Before the experiment people were not used to fertilize their fields with urine. Therefore, many of the villagers were keen to see the results of the growing experiment. Although the experiment was not so successful from the researcher point of view, village residents who came to see the experiment were impressed about the results.

After seen the results with their own eyes and being involved in sanitation education sessions arranged by the project, a change could be seen towards better understanding of the usage of the latrine waste in the project area. Also attitudes towards the use of human excreta have become less negative. More and more people have got involved in sanitation clubs formed in the village areas. In November 2008 there were nine sanitation clubs and each of the clubs has established their own test gardens.

In the beginning of this growing season, village people are testing the urine from their new village dry toilets for growing maize, cabbage, tomatoes and rape. Many of the people were convinced that urine is a very good fertilizer and many of them said that they have seen the results in Luansobe School garden. This is a very good sign for us, since we now know that despite the problems we had in the pilot plot, people have seen the results and are convinced that they should have their own garden too.

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